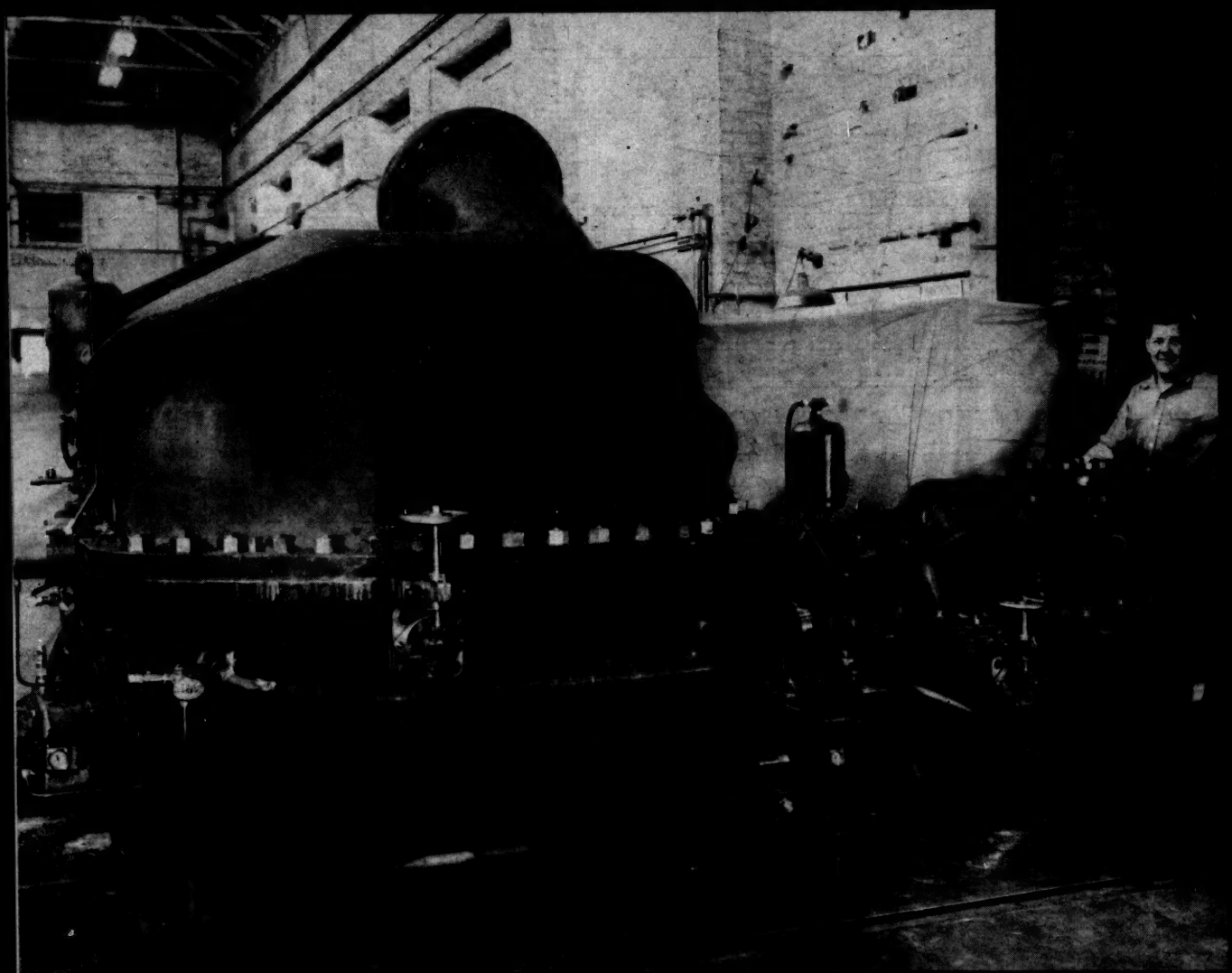
INDUSTRIAL REFRIGERATION



Now- Trade In! Trade Up!

Up to 24 months to pay on Gifford-Wood's famous Type CA cuber

GET THIS NEW 26,000-AN-HOUR CUBER WITH G-W'S GREAT NEW TRADE-IN DEAL!

Here's a top deal that can increase your ice cube volume overnight! Think of the extra business you'll handle... the reduced labor and handling costs you'll have... and the years of trouble-free service you'll get with a new Gifford-Wood Cuber in your plant.

And the best news is G-W's generous trade-in offer! Turn in your old G-W Cuber—it serves as your down payment. Then take up to 24 months to pay with G-W's new and easy Pay-Way Plan! You're earning big profits while your G-W pays for itself by turning out up to 26,000 perfect ice cubes an hour.

G-W's Type CA Cuber is specially designed to eliminate ice waste. As soon as the first cake is ¾ cut, the second cake slides easily into place, pushing the remaining quarter into the saws. And every part of the cuber that touches the ice is not only sturdy, but completely corrosion-proof. Maintenance costs are rock bottom.

Write today for a Bulletin which fully describes this advanced Type CA... and let a G-W representative tell you just how much you'll get when you trade in your old G-W Cuber. (You'll be pleasantly surprised!) And if you're just coming into the market for a large-volume cuber, why not find out how a low-cost, *completely reconditioned* G-W Cuber can build up business—*fast!* For even if you don't have a cuber to trade, you may wish to take advantage of G-W's terms!

1021

GIFFORD-WOOD CO.
Hudson, N. Y.

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420 Lexington Avenue

St. Louis 1
Railway Exchange Bldg.

Cleveland 20
3537 Lee Road

Chicago 6
565 W. Washington St.

Pacific Coast Representative:
Western Ice Equip. Co., 420 Market St., San Francisco 11

Scorers, Breaker-Elevators, Conveyors, Breakers, Tools and all types of ice handling equipment.

GIFFORD-WOOD CO., Hudson, N. Y.

☐ Send me your Bulletin on G-W Cubers.

☐ Ask a G-W Representative to call with full information on your proposal at no obligation to me, of course.

Name_____

Address_____

City_____ Zone____ State_____

STOP

"Butcher Boy"

Since 1885

No. 51 AUTOMATIC ELECTRIC DOOR DEFROSTER

(WITH THERMOSTAT)

ELIMINATE ICING GASKET CONDITIONS ON YOUR FREEZER DOORS WITH BUTCHER BOY No. 51 AUTOMATIC ELECTRIC DEFROSTERS INSTALLED IN NEW FRAME CASINGS.

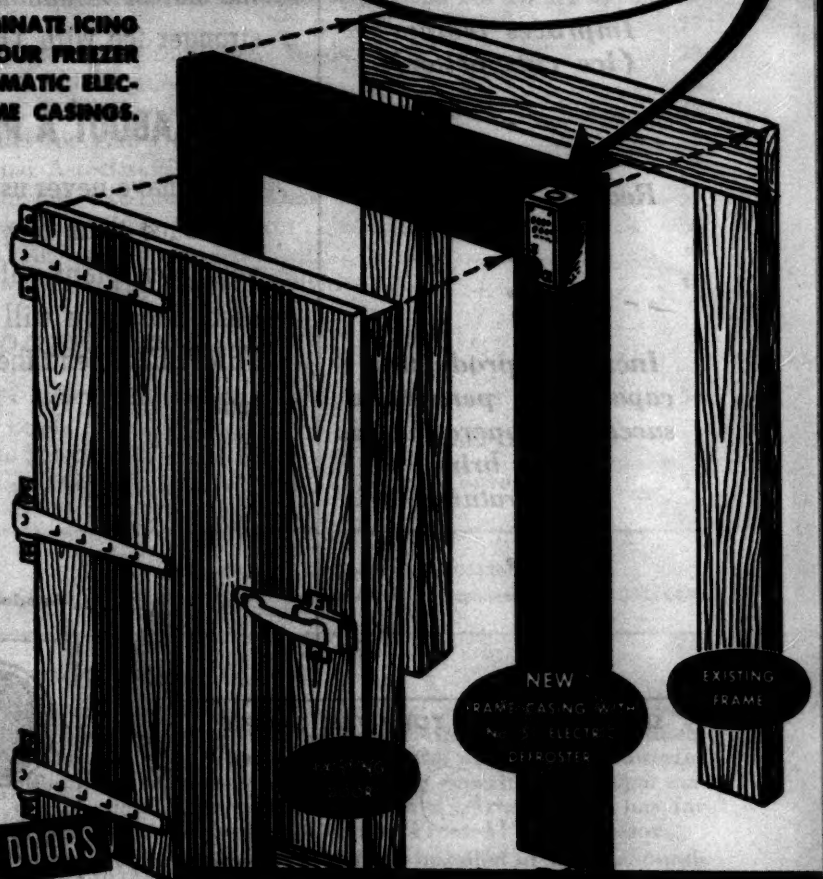
Easy to Install

ON YOUR PRESENT DOORS

1. Remove the door and hardware from your present frame.
2. Install factory furnished frame casing with defrosters, to existing frame casing and secure in place with provided fastening devices.
3. Reinstall the door and hardware to new frame casing.
4. Connect to 110 Volt AC line and "Frost Free" door is ready for normal operation.

Each complete unit is equipped with a "calibrated thermostat control", (adjustable range 60° to 250°F), for economical heat control. Thermostat has "pilot light" as constant guide for "on current" operation — Safety and Security Insurance.

Electrical materials incorporated into Butcher Boy No. 51 Defroster Units are Underwriters Appoved.



For BOTH Infitting and Overlap DOORS

Butcher Boy Refrigerator Door Co.
1000 Butcher Boy Drive, Harvard, Illinois

Please send details and prices for factory furnished frame casings with No. 51 automatic electric defrosters.

For Super Freezer Overlap Doors ☐ _____wide x _____high

For Infitting Freezer Doors ☐ _____wide x _____high

Name _____

Address _____

City _____ State _____

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FASTER ICE... with Templets

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Industrial Refrigeration

August 1957

Now in its 66th Year of Publication

Number 2

Vol. 133

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Contents

Refrigerated Warehouse Installed in Underground Limestone Quarry 15
ASRE Annual Meeting 19
"Piggy-Back" Unit Delivers Bulk Crushed Ice 21
New Synthetic Rubber and Plastics Plant Has Specialized Refrigeration System 23
Research on Tenderizing Frozen Poultry 26
Inside-Out Wall in New Warehouse Planned For Future Expansion 27
Refrigerated Vans for Frozen Foods 28
Hospital Refrigeration Needs 30
ASHAE Holds Annual Meeting 48
Ice Sales for 1956 Decline 49
National Association Practical Refrigerating Engineers 35
From the Vice-President's Desk 35
Codes and Local Ordinances 36
NAPRE Question Box 40
News Notes and Chapter Activities 44

Departments

What's New in Equipment ... 4
Press Briefs 8
In The Spotlight 13
News of People 51
Manufacturers News 54
Catalogs and Bulletins 54
Coming Conventions 53

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The Cover:

David and Goliath of the centrifugal refrigerant compressor line. The Bible Story proved that size doesn't always mean much. The same is true here. What is said to be the world's most powerful air conditioning compressor is the 2250-ton capacity centrifugal machine on the right. Using "Freon-12" as a refrigerant, it has far more capacity than the larger 1500-ton "Freon-11" compressor.

The new compressor is one of four installed at the mammoth Garden State Plaza Shopping Center in Paramus, N.J., which opened officially May 1. Weighing only 9200 pounds as compared to the 22,000 pound compressor on the left, the "little giant" has fifty tons more capacity than each of the "Freon-12" compressors heretofore considered the world's most powerful, which were installed in the U.S. Capitol powerhouse a year ago. The compressors pictured and those in the U.S. Capitol were manufactured by York Corp., Subsidiary of Borg-Warner. See story on page 17.

What's New

MACHINERY
APPLIANCES • PROCESSES

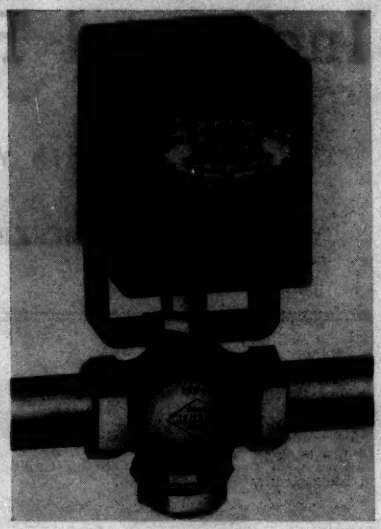
New Fiber Gasketing

FIVE new high density fiber gasketing materials that make it possible to obtain seals at lower flange pressures have been developed by the Industrial Division of the Armstrong Cork Company. The new materials enable the company to offer a more complete line in the Accopac series, a recently developed group of gasketing materials that have more flexibility, dimensional stability and uniformity than conventional fiber gaskets. In the unique manufacturing process, the fibers are uniformly coated with a synthetic rubber saturant while still dispersed in water. This is done by a patented modification of the "beater-saturation" process.

Armstrong now has 15 Accopac gasketing materials for applications having flange pressures in excess of 800 pounds per square inch, for both low and high temperature applications. The materials may be used with any type of fluid.

New Motorized Valve

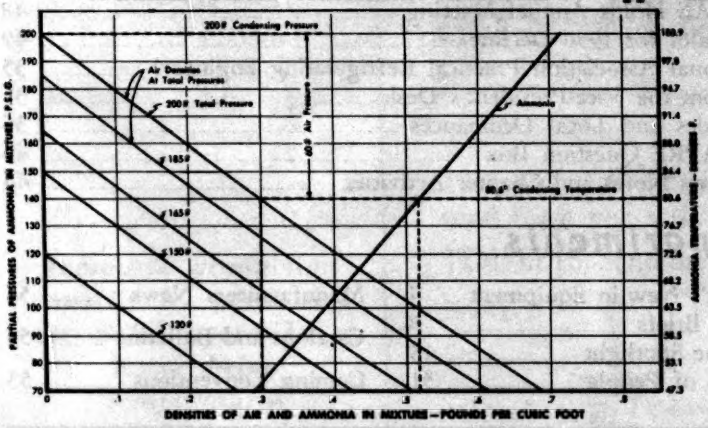
ALMOST all of the desirable features of automatic valve operation have been simplified in one inexpensive unit by The New England Gear Works, Southington, Conn. Available in ten sizes: ¼ to 3-inch with Jenkins bronze globe body, three voltages; 24V, 115V, and 230V, and three timing cycles; eight, thirty-two and 139 seconds, this unit is adaptable to a great number of applications such as heating, air-conditioning, processing, safety, convenience, and original equipment. It features automatic disc compensation, extremely tight shut-off, 150 pounds pressure capacities on most sizes, no mounting restrictions, permanent lubrication, quiet positive operation without linkage, machine cut hardened steel gears, only eight moving parts, compact size (operator measures 3-5/8 in. x 3-5/8 in. and remains constant on all ten sizes, entire unit small enough to fit between 16 inch floor joists).

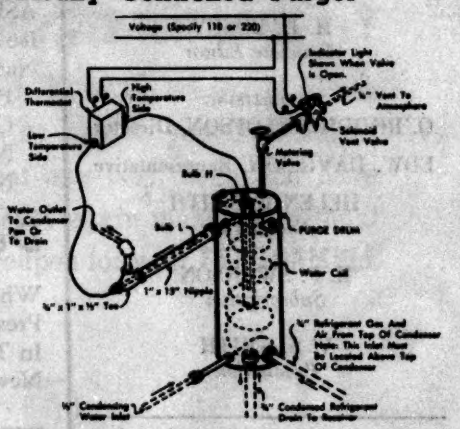


The "New England" motorized valve.

The unit can be controlled by any positive action single-pole double-throw switch such as temperature, float, manual, time, program, or pressure actuated switches. It is heavily constructed to insure long life.

Watkins Offers Automatic Condenser Type Electrically Controlled Purger




Voltage (Specify 110 or 220)
Indicator Light Shows When Valve Is Open
Differential Thermostat
High Temperature Side
Low Temperature Side
¼" Vent To Atmosphere
Solenoid Vent Valve
Metering Valve
Bulb H
Water Outlet To Condenser Pan Or To Drain
Bulb L
PURGE DRUM
Water Coil
1" x 13" Nipple
¾" x 1" x ¾" Tee
¾" Refrigerant Gas And Air From Top Of Condenser Note: This Inlet Must Be Located Above Top Of Condenser
¾" Condensing Water Inlet
¾" Condensed Refrigerant Drain To Receiver

PURGE drum with internal water coil, differential, thermostat, solenoid, vent valve (with pilot light), metering valve, fittings, and hangar clips, are the components offered in a Watkins Purger unit announced by J. E. Watkins Company of Maywood, Illinois. An automatic condenser type, the purger is electrically controlled. At present two models are offered, one for up to 300-tons of refrigeration and the other for plants over 300-ton capacity.

The Watkins purger operates on the principle that air and most noncondensable gases are lighter than ammonia refrigerant in normal operating mixtures. Therefore, if the mixture is not agitated the air will usually rise to a point where it can be easily vented. Literature offered by the firm in substantiation of this theory shows a chart which compares the densities of air and ammonia in mixture, in lbs per cubic foot (see left, the illustration above).

According to the manufacturer's literature if the high side gauge pressure in an ammonia refrigerant system is 200 psig and the condensing temperature is 81 F as shown above; then, approximately 60 psig of the total pressure is caused by air in the system, since the density of air at 200 lb. psig is .30 lbs. per cu. ft. and ammonia at that pressure is .52 lbs. per cu. ft.

Operation

Condensation of the refrigerant out of the mixture allows air or other non-condensables to collect in the upper part of the purger drum, pictured above at right. As the non-condensables are cooled by the water coil within the drum the temperature of the gases approaches that of the water temperature leaving the coil. When bulb H. (gas sensing) and bulb L (water sensing) approach the same temperature, the differential thermostat furnished is tripped and opens the solenoid vent valve.

Gradually, as the condensables are bled off through the metering valve in the line ahead of the solenoid vent valve, the area of bulb H covered by the condenser gases increases. As the rising temperature of the bulb increases substantially from the temperature of bulb L, the thermostat is again tripped and closes the solenoid vent valve. The manufacturer insists that the purger be placed in the highest point of the system where non-condensables collect. Refrigerant condensed out of mixtures introduced to the purger are drained by gravity to the receiver.

The Watkins purger can be furnished for other refrigerants than ammonia. In addition to reducing condensing pressure, thereby reducing power costs, the Watkins purger is described as fully automatic — releasing personnel from either tedious hand purging, or supervision of other types during purging operations. The firm also points out that the purger provides some additional condensing surface when not actually operating as a purger.

Extra-Large
CAPACITY

for FREON and AMMONIA

NOW...no job is too large for the KRAMER THERMOBANK

The only completely automatic system for freezing temperatures offering these extra large capacities. THERMOBANK requires no manual attention whatsoever.

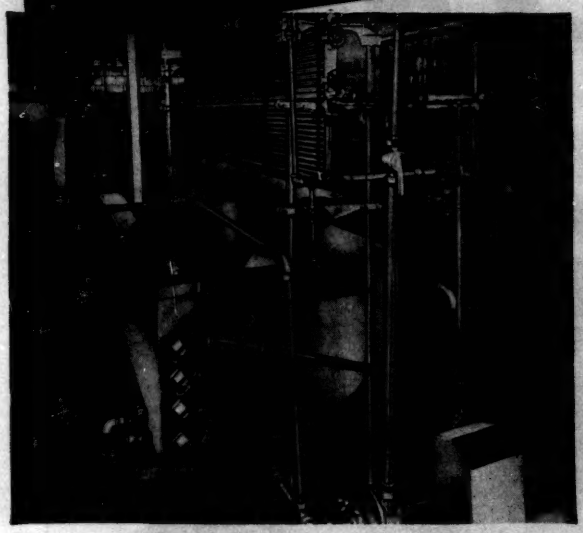
Ceiling mounted, THERMOBANK takes no precious floor space. You can store products directly under the unit.

Can be used as an independent system or with an existing large system without affecting the operation of other evaporators.

WRITE FOR BULLETIN 294-B

KRAMER TRENTON CO. • Trenton 5, N.J.

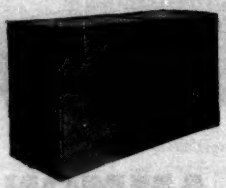
BEST IN REFRIGERATION
FOR SWEET WATER COOLING



Ashton Cheese Company, Ashton, Illinois

DOLE *Ice-Cel* UNITS are applicable for many types of product cooling such as milk and cream, air washers for hot bread and cake coolers, jacket water for dough mixers, jacketed holding tanks, and for various processes in candy making. Compact and simple in operation. Easily installed. Low maintenance cost. No moving parts. No servicing necessary.

Let DOLE engineers show you how *Ice-Cels* can fit your needs. Write for engineering data. No obligation.



DOLE REFRIGERATING COMPANY
5938 NORTH PULASKI ROAD, CHICAGO 30, ILLINOIS
103 PARK AVENUE, NEW YORK 17, N. Y.
In Canada: Dole Refrigerating Products Limited
44 Elgin Street, Brantford, Ontario

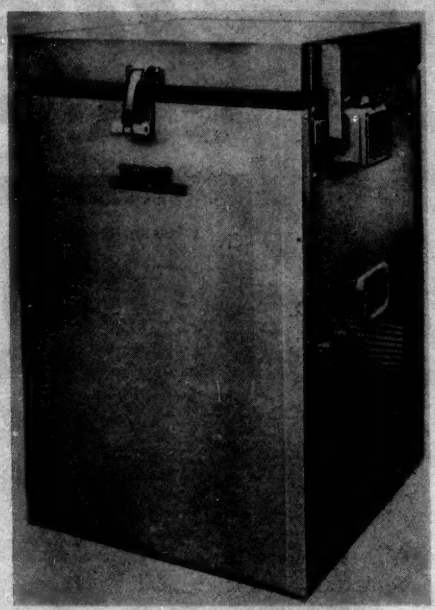
SURE SIGN OF DEPENDABLE REFRIGERATION

Maximum Refrigeration Efficiency
DOLE
THE *Cel* LINE

Ice-Cel UNITS

Sub Zero Coolers for Rivets

NEW features of light weight and portability are included in the design of the 1 cubic foot rivet cooler manufactured by Webber Engineering Corp., Indianapolis, Ind. Weighing only 68 pounds, this unit can be easily moved for convenience to work area. Cooler requires only connection to electrical service to place in operation. Twenty-five aluminum canisters with perforated bottoms are held in the cadmium plated rack of the storage compartment of this Model. Each of these canisters will hold 1 lb.

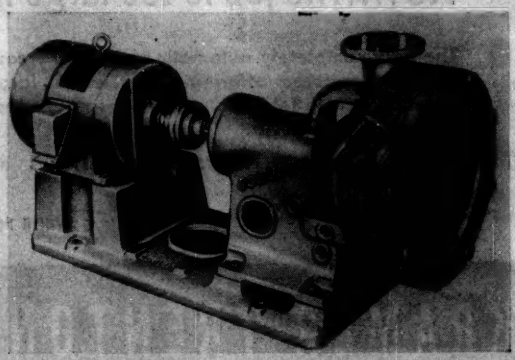


Model WE 1-40 Webber rivet cooler.

of 17 S.T. or 24 S.T. aluminum rivets. While the temperature requirement for aluminum rivet storage is −30 F., the unit has a maximum range of −50 F. Reducing the temperature of aluminum rivets to −30 F prevents a hardening reaction which takes place at room temperature, necessitating use of rivets within a short time after heat treating. By storing at −30 F immediately after treatment rivets remain soft, workable and head perfectly without danger of cracking and splitting. Rivet compartment measures 11½ in. long x 11½ in. wide x 12½ in. high. Outside dimensions of refrigerator are 21 in. long x 21 in. wide x 28 in. high.

Goulds-Pfaudler Glassed Centrifugal Pump

A GLASSED centrifugal pump which will withstand the effects of most corrosives used in the chemical, pulp and paper plastic and petrochemical industries has been developed by Goulds Pumps Inc., of Seneca Falls, New York, and The Pfaud-



The new Goulds-Pfaudler glassed pump

ler Co. of Rochester, New York. In addition, since all parts of the pump coming in contact with the liquid being handled are glassed and easily cleaned, the pumps will find many other uses in the food and other process industries.

The new glassed pump is completely inert to all common acids except hydrofluoric. Even at high temperatures, all acids except hydrofluoric and concentrated phosphoric leave working surfaces unaffected it is claimed. Glass surfaces of the pump are also immune to the corrosive action of all alkalis up to pH 12 and temperatures up to 212 F.

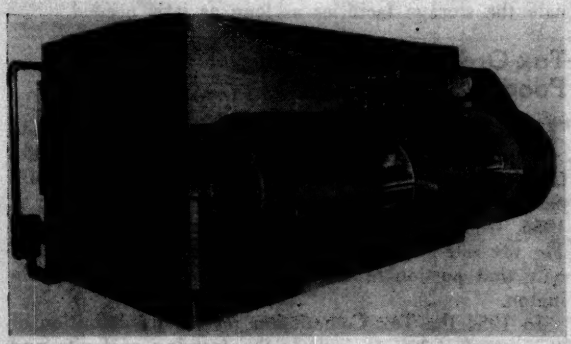
Through a series of successive applications and firings, the glass is permanently fused to the metal pump parts so that the glass and metal interlock mechanically and form an inseparable bond. In addition, because of the interlocking action of the glass and metal at fusion temperatures, fractures will not "run". Therefore, sharp mechanical impact can cause damage only at the point of impact. The glassed pump will normally withstand quick changes of temperature of the liquids handled up to at least a 200 F. differential and higher depending upon operating conditions. Since glass has no catalytic or contaminating effect in any known case, there is no possibility of side reaction or contamination.

The new pump is available for heads up to 140 feet and is built in four sizes with capacities up to 700 GPM. Suction piece, casing and casing cover are all glassed where there is liquid contact. The semi-open, statically and hydraulically balanced impeller is glassed on all sides.

New Vilter Evaporative Condensers

THE VILTER Manufacturing Company Milwaukee, Wis. announces it is now offering two new lines of evaporative condensers, the VXF and the VSC, both suitable for Freon or ammonia.

The new VXF (Vilter External Fan) condenser is available in capacities of 30 through 300 nominal tons for both ammonia and Freon. Since the fan on the VXF is externally mounted, it does not handle the moist saturated air from the spray chamber. This minimizes corrosion and greatly extends fan life. Servicing of fans and bearings is also facilitated because of the external mounting.



The new Vilter VXF evaporative condenser. This unit has a capacity of 175 tons

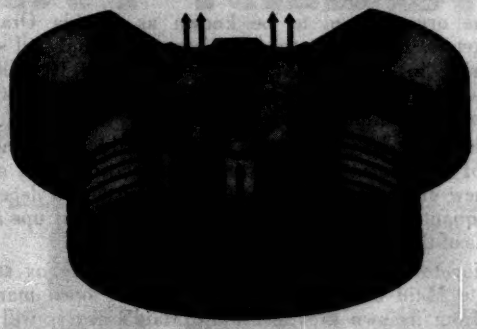
The prime surface condensing coils which are hot dipped galvanized are pitched to facilitate the gravity-flow of the condensed refrigerant to the liquid outlet headers. Coils are staggered for better heat transfer and complete wetting of coil surface. The coils are also spread sufficiently so that the air pressure drop is at a minimum, thus reducing power requirements and keeping noise to a minimum. This condenser is available in capacities of 50 through 300 nominal tons.

In contrast the new VSC (Vilter Standard Condenser) is designed primarily for indoor use, although it can be installed outdoors. The VSC is of the sectional frame type and can be dismantled into three sections for easy indoor placement and simplified erection. The unit is readily adaptable to ductwork and provides a means of ventilating the room in which it is installed. The prime surface condensing coils which are hot dipped galvanized after fabrication are ¾ inch schedule 40 steel pipe and are suitable for either Freon or ammonia.

PERFORMANCE!

New BALL VALVE

INCREASES THE PERFORMANCE OF ANY COMPRESSOR—OLD OR NEW



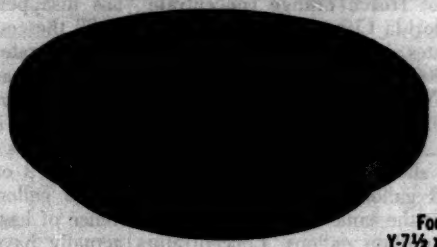
New "BV" Ball Valve passes 26% more gas in actual tests conducted by a leading independent research organization. Users report amazing increases in performance when they install Ball Valves. And, not one report of failure in operation—Ball Valves are free from valve breakage!

EASY TO INSTALL

No drilling or tapping — BV is simply screwed in, then locked in place in seconds with the special locking ring.

STANDARIZED

SUCTION VALVE ASSEMBLIES FOR MOST COMPRESSORS



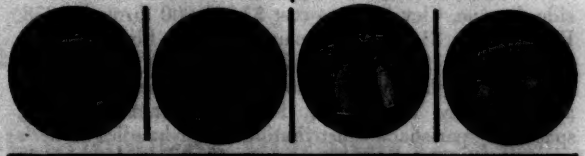
For: Y-7½ x 7½

For information on improving your compressor performance, send us the name, bore, stroke and speed of your machine.

BALL VALVE CO.

P.O. Box 53 • Kansas City 41, Mo.

Some franchise territories open. Write for information.



VALVES CARRIED IN STOCK FOR LEADING HEAVY DUTY COMPRESSORS

PRESS BRIEFS

Florida Orange Co-Op Will Supply Minute Maid

A GROUP of Florida orange growers representing between five and six million boxes annual output formed a new cooperative at Lakeland, Fla. to serve as sole supplier for Minute Maid Corp.'s frozen juice concentrate production.

The organization, to be known as Florida Orange Marketers, Inc., currently has 25 members and will seek to bring in growers with another seven to 10 million boxes. Minute Maid's annual needs are estimated at 13 million to 14 million boxes.

John M. Fox, president of Minute Maid and a member of the executive committee of the cooperative, said the new organization assures the company "of a dependable quantity of fruit" and "removes the risk of ups and downs of the fruit market."

Prior to formation of the cooperative, Mr. Fox said, Minute Maid obtained its oranges on the open market and from its own groves. Minute Maid's groves will be signed into the new association on the same basis as the other members, Mr. Fox added.

J. Dan Wright, Jr., president of Florida Orange Growers and a member of the Florida Citrus Commission, said, "This organization will serve as the sole supply unit for Minute Maid, and the fruit furnished will be processed for the new association's account and all proceeds above the cost of processing and marketing will be returned to the growers, less a small percentage of net sales for Minute Maid's services."

George Ware, Leesburg, Fla., banker, was named chairman of the board for the cooperative.

Concentrate Surplus Decreases

A "SO-CALLED surplus" of almost 8,500,000 gallons of frozen orange concentrate "has disappeared", says Florida Citrus Mutual. "As of June 8" the cooperative states, inventories of frozen orange concentrate were 8,363,000 gallons greater than at that date one year earlier. "Now," it emphasizes, "this so-called surplus has disappeared." In a statistical table accompanying its remarks, Mutual uses figures from Florida Canners Association showing total stocks on hand on June 8 of 38,088,408 gallons, compared with 37,622,485 gallons on hand on the same date in 1956, a difference of less than a half million gallons. Concentrators actually have less on hand than a year ago in the familiar six-ounce and other retail size cans-29,368,134 gallons this year and 29,928,228 gallons a year ago, or 560,094 gallons less.

Perishables Center To Add Refrigeration

AN EXPANSION and modernization program has been announced by Fisher Brothers Co. 2323 Lakeside Avenue, Cleveland, to cost $3,200,000 through 1958. Planned is a $1,000,000 expansion of the Fisher's distribution center for perishables at 2735 East 40th Street. Size of this plant will be doubled with the addition of approximately 100,000 sq. ft., including refrigeration space. The perishables distribution center handles Fisher's meats, milk and dairy products, as well as other perishable items. The remaining $2,200,000 in the budget will be spent for eight new retail stores.

Cold Storage Unit Leased

LEASE of a 6,000,000-lb cold storage plant in Auburn, Wash. by Stokely-Van Camp, Inc., for use as a consolidated cold storage and shipping depot serving Washington state operations has been announced by Kirk Campbell, manager of the firm's Kent plant.

Campbell said Stokely-Van Camp operation of the Army's Auburn General Depot refrigerated warehouse would start immediately with an annual payroll running in excess of $194,000 and a staff of more than 22 employes at the plant. Use of the building on a lease basis was offered recently by the Army's District Engineers, with the Stokely-Van Camp firm the successful bidder. Col. J. M. Shanks, depot commander, said the cold-storage plant had not been in use by the army for several months and the lease was standard army policy for that type of building.

Stokely-Van Camp will be able to store its frozen foods at zero degree temperature, Campbell explained. The firm will ship about 750 carloads of frozen produce annually from the Auburn Cold storage warehouse.

Ice Serves Devastated Area

IN THE relief and rehabilitation work at Cameron Parish, La., following the devastation of a storm there in late June, Ice was called on as an emergency to preserve foods and supply drinking water. The T. L. James Company loaned the Red Cross a 150 kw generator unit to place the Pure Ice Company plant at Cameron in operation. The plant will be used to store foods and produce drinking water. The unit was installed by the Boyce-Harvey Caterpillar Tractor Co. of Lake Charles.

The unit was loaned without charge by the T. L. James Construction Co. and reassigned from a project already underway. Installation was without charge to Red Cross. W. L. Parkin, president of Pure Ice, said they would donate the storage facilities as long as it is needed.

Tax Ordered on Freezing Food in Washington

THE STATE of Washington has won its court fight to apply to manufacturer's tax against firms that freeze fresh fruits and vegetables. The tax amounts to 4-10's of 1 percent of each firm's gross income. Prior to March 1, 1954, frozen food producers were taxed as wholesalers. The tax rate was the same but the state could collect on only that portion of the products distributed in Washington.

In 1954 the Tax Commission revised its definition of "to manufacture" to include the freezing of fruits and vegetables. Then the commission levied the manufacturer's tax against the entire output of the frozen food industry in the state, substantially increasing the amount of tax revenue from that source. Stokely-Van Camp, Inc., Mt. Vernon, challenged the Tax Commission's action and sued to recover the taxes it had paid under protest.

City Products Expands Unit

A $1.5 million expansion of the Longview (Tex) refinery of The Premier Oil Refining Company is announced by City Products Corporation, Chicago. With the completion of the expansion, Premier announced an increase in the octane level of both its regular and ethyl gasolines and launching of "an aggressive advertising and merchandising program" to market the new products. Premier is a wholly owned subsidiary of City Products.

Jenni Genetron says,

"HERE'S THE RIGHT REFRIGERANT FOR EVERY NEED!"

genetron® SUPER-DRY REFRIGERANTS

Selected Physical Data (Performance based on 5°F evaporator temperature and 86°F condenser temperature)	genetron 11 ORANGE LABEL	genetron 12 WHITE LABEL	genetron 22 GREEN LABEL	genetron 113 PURPLE LABEL	genetron 114$_A$ DARK BLUE LABEL
Chemical Formula	CCl_3F	CCl_2F_2	$CHClF_2$	$C_2Cl_3F_3$	$C_2Cl_2F_4$
Molecular Weight	137.4	120.9	86.5	187.4	170.9
Boiling Pt. (°F) at 1 Atm. Pressure	74.7	—21.6	—41.4	117.6	37.6
Evaporator Pressure at 5°F (p.s.i.g.)	24.0*	11.8	28.3	27.9*	15.6*
Condensing Pressure at 86°F (p.s.i.g.)	3.6	93.3	159.8	13.9*	22.7
Freezing Point (°F) at 1 Atm. Pressure	—168	—252	—256	—31	—76
Critical Temperature (°F)	388	234	205	417	294
Critical Pressure (p.s.i. absolute)	635	597	716	495	478
Compressor Discharge Temperature (°F)	112	101	131	86	88
Compression Ratio (86°F/5°F)	6.24	4.08	4.06	8.02	5.33
Specific Volume of Saturated Vapor at 5°F (cu. ft./lb.)	12.27	1.46	1.25	27.04	4.04
Latent Heat of Vaporization at 5°F (B.t.u./lb.)	84.0	68.2	93.6	70.6	60.2
Net Refrig. Effect of Liquid—86°F/5°F (B.t.u./lb.)	67.5	50.0	69.3	53.7	43.0
Specific Heat of Liquid at 86°F (B.t.u./lb.°F)	0.21	0.24	0.34	0.22	0.23
Specific Heat of Vapor at Constant Pressure of 1 Atm. & 86°F (B.t.u./lb.°F)	0.13	0.15	0.15	0.15	0.16
Specific Heat Ratio at 86°F & 1 Atm. (k=Cp/Cv)	1.14	1.14	1.18	1.09	1.01
Coefficient of Performance	5.09	4.70	4.66	4.92	4.60
Horsepower/Ton Refrigeration	0.927	1.002	1.011	0.960	1.025
Refrigerant Circulated/Ton Refrig. (lbs./min.)	2.96	4.00	2.89	3.73	4.65
Liquid Circulated/Ton Refrig. (cu. in./min.)	56.0	85.6	68.0	66.5	88.7
Compressor Displacement/Ton Refrig. (c.f.m.)	36.32	5.83	3.60	100.76	18.78
Toxicity (Underwriters' Laboratories Group No.)	5A	6	5A	4-5	6
Flammability & Explosivity	None	None	None	None	None

*Inches of mercury vacuum.

COMPARE! Careful control at every step in the manufacture of "Genetron" Super-Dry Refrigerants results in products of highest purity, which are extremely low in moisture content and other undesirable impurities. Quality of current production consistently *surpasses* the rigid manufacturing specifications for these products. Write for important informative folder "Genetron Super-Dry Refrigerants."

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SHANK
AMMONIA VALVES

Rugged and Accurate Construction
For Long-Life and Dependability!

Largest Line of Ammonia All-Steel Cadmium Plated Bar Stock Valves in the Industry

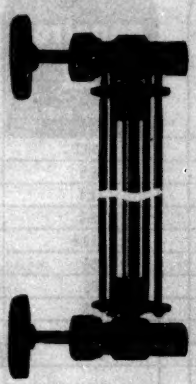
IMMEDIATE DELIVERY
ON OUR COMPLETE LINE

ALL-STEEL GAUGE SETS

Automatically shut-off liquid in case of glass breakage.

For Ammonia, Freon and Methyl Chlorides.

All parts are rust-proofed by plating. Valve stems are packed with composition packing rings which insure a long-life, no-leak seal.



RELIEF VALVES

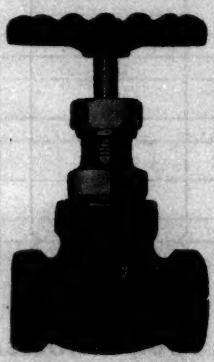
For Ammonia and Freon. Angle type, one-piece body with screwed ends and rust-proofed finish.

Positive relief action and reseating are assured by the design of the seat used. For ⅜", ½", ¾" and 1" pipe size.

SEMI-STEEL
SHUT-OFF VALVE

Made of highest grade, non-porous metal obtainable.

Double-seated stem is of rust-proofed steel. Valve ports are full size insuring maximum flow. Composition packing ring is impregnated with graphite for ease of operation and will not deteriorate in service.



Write for catalog.

CYRUS SHANK COMPANY

4650 West 12th Place, Chicago 50, Illinois

Small Diesels to Power "Reefers"

THE first major improvement in fast transportation of perishable foods is now in the making with the development of self contained, diesel powered refrigeration equipment for railroad "reefer" cars, it was revealed recently. The development of compact, trouble free refrigeration systems is now possible through the use of low horsepower, air-cooled diesel engines, products of the only domestic manufacturers of these long-lived prime movers, American M.A.R.C. of Inglewood, Calif.

W. Denis Kendall, president of American M.A.R.C., recently revealed that four concerns were presently engaged in production of prototype units for railroad refrigeration cars. Prior to this new use for the 6-½ hp to 18 hp diesels, almost the entire production of American M.A.R.C. diesels has gone to the U.S. Navy and Marine Corps, according to Mr. Kendall.

Success of the low cost, maintenance-free diesels in military service has led to numerous other applications. However the application to mobile refrigeration units may tie up a large portion of the non-military production of American M.A.R.C., according to company officials. The small diesels, operating on inexpensive fuels, are almost completely trouble free and will function in any weather for upwards of 10,000 hours of continuous running, without failure. The military services use American M.A.R.C. diesels principally for electric generating equipment, powering isolated radar units for auxiliary equipment at air fields and on vessels.

Seaway Will Open Field For Refrigerated Warehousing

THE St. Lawrence Seaway, due for completion in 1959, may result in additional business for refrigerated warehouses in the areas it will serve, according to NARW Quick Sheet. Already increasing amounts of perishables including German beer, Dutch cheese, and Norwegian fish are reported to be moving into the mid-west through the St. Lawrence in anticipation of expanding markets there as a result of the lower water transportation costs. New export possibilities are also opening up.

Isbrandtsen Line is reported prepared to build or otherwise acquire eight ships of 8,000 to 8,500 tons, some of which will be equipped with refrigerated holds, for use on the seaway route when it opens. In 1946 only two shipping lines were operating between Great Lakes and foreign ports. Today there are 27. By 1960 shipping men predict 60 lines will be in the trade.

Air Conditioning Corp Absorbs Hughes-Keenan

THE Hughes-Keenan Corp. Delaware, Ohio has merged with the U. S. Air Conditioning Corp. of Philadelphia, the two companies announced recently. Glenn W. Way who becomes chairman and president of the new organization said it would retain the U. S. Air Conditioning name, and Hughes-Keenan would become a division of the Philadelphia firm.

Hughes-Keenan manufactures and sells wheel-type, material handling motive cranes and delivery type truck bodies. It was formed in 1947 by consolidation of Hughes-Keenan Co., Correct Manufacturing Co. and Burkett Closed Body Co.

U. S. Air Conditioning is one of the oldest firms in the air conditioning field. It also makes residential warm air, gas and oil-fired furnaces.

Irving R. Klein and Associates, architects

"We saved over $3,000 in construction costs by the use of Styrofoam®"—Grocers Supply Company, Inc.

"We chose Styrofoam to insulate 9,722 square feet of cooler and freezer storage space because we have found an over-all economy in its use, and a specific saving of about ten per cent in both initial cost in installation and in costs of electricity. More than $3,000, or six per cent of building costs, was saved in the construction of our new plant by the use of Styrofoam." This statement was recently made by George Levit, vice president of Grocers Supply Company, Inc., Houston, Texas.

"Styrofoam," continued Mr. Levit, "is completely effective in maintaining desired temperatures. Our cooler is kept at a constant 35°-37°, and the freezer room stays at minus ten to twelve degrees. We've had no variation in those ideal temperatures since opening our new plant."

For more information about Styrofoam, write to THE DOW CHEMICAL COMPANY, Midland, Mich., Department PL1705C.

CHECK THIS EXCLUSIVE COMBINATION OF PROPERTIES

STYROFOAM FIRST IN PLASTIC FOAM INSULATION	Insulations	Low "K" factor	Superior water resistance	High compressive strength	Light weight	Superior resistance to rot and vermin	Easy handling and fabrication	Low-cost installation	Lowest cost per year service
	Styrofoam	●	●	●	●	●	●	●	●
	A		●	●		●			
	B	●			●			●	
	C	●		●					

YOU CAN DEPEND ON DOW

"Three things sold me on CAT* power"

—J. B. EWING, VALLEY ICE CO., LINCOLN, NEBR.

Here are the three things that sold Mr. Ewing:

1. The ability of Caterpillar Engines to use natural gas as fuel.
2. Their steady-running, trouble-free reliability.
3. The availability of good dealer service and parts.

His two Cat D13000s have operated over 32,000 hours, working 24 hours a day throughout the eight-month full-capacity season. Both engines are used to drive Frick compressors.

Last fall Valley Ice Co. purchased a new Cat D342 Engine to replace one of another make. Added to the two D13000s, it gives the plant an output of 100 tons of ice per day.

Caterpillar dependability is a byword in the ice and refrigeration industry. Cat Engines have produced records as high as 100,000 work hours, and many old-timers are still on the job after paying for themselves many times over.

Today there are two *new* spark-ignition Caterpillar Engines—the D397 and D375—specially equipped for economical use of natural gas. The 10 to 1 compression ratio, unusually high for natural gas engines, means increased efficiency. And the spark coil at each cylinder and low-tension magneto give you hotter spark and trouble-free life.

Your Caterpillar Dealer can give you complete information about these new engines. And he stands behind them with prompt service and Caterpillar parts you can trust. Call him today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

In the Spotlight

ANOTHER refrigerated warehouse has been installed in an underground limestone quarry near Fayetteville, Ark., known as Zero Mountain, Inc. It has 28,000 square feet of usable food storage space, with room for future expansion if needed. The promotors of the project point to its strategic factor from the standpoint of National Defense. Other advantages include economy in construction and operation. For full description of this unique cold storage operation see story starting on page 15.

DESIGN ENGINEERING and research appear at times rather abstract from practical application. However, consumers or users of industrial refrigeration may obtain an insight into the reasons for packaging research, the designing of computers for energy measurement, and laboratory experiments with electrical insulations, from the review given the ASRE annual meeting on page 19. Some potential uses of the molecular sieve are given, as well as two methods of producing ultra-low temperatures for metallurgical studies. Also a new process for hydrogen liquefaction, and its storage. Some of the more important papers are abstracted briefly.

FROZEN FOODS has become big business and is getting bigger and this has entailed a growth of frozen food transportation because adequate transportation is necessary to keep these foods in top condition. To provide this good service, a study was made by the Agricultural Marketing Service of the U.S. Dept. of Agriculture to determine how much space is necessary to provide adequate circulation around a load of frozen foods. For results of study, see page 28.

"PIGGY-BACK" trucks, specially designed for delivering bulk crushed ice, is being used by the Colorado Ice & Cold Storage Company, Denver, Colorado, for serving the bigger commercial customers. Two heavy galvanized metal tanks, holding one ton of crushed ice are mounted on heavy channel steel box frame. They are removed at place of delivery, replaced by empty tanks. For description and pictures see article on page 21.

DIRECT-EXPANSION ammonia under full automatic control is used throughout the cooling process in new synthetic rubber and plastics plant of the Chemical Division of the Goodyear Tire & Rubber Co. at Akron, Ohio. Four two-cylinder ammonia compressors handle the main refrigerating load and a 5 by 5 compressor supplies pump-out service. A complete description, with pictures, of the refrigerating equipment, is presented in the article on page 23.

FINDINGS from research on tenderizing frozen poultry have been published by the USDA Western Branch. The most important factor, it was found, is the amount of time the carcass is held in chilled or unfrozen state before cooking. Changes in practice have tended to minimize the period of aging before freezing. Other results are given in the article on page 26.

AN UNUSUAL method of applying insulation was used on a modern warehouse opened last year by the Hartford Freezer Corporation. To provide for future expansion one insulated wall was designed inside-out, with eight inch corkboard insulation on the outer rather than the inner side of the concrete-block wall. See page 27.

REFRIGERATION essential to a modern hospital is described and illustrated in a report of a trip by a group of NAPRE members. Purpose of the visit was to observe the installation and operation of the refrigeration and air conditioning equipment of the institution as an example of what was being done in other medical centers. The story of the inspection trip is told in article starting on page 30.

REFRIGERATING plant failures can be prevented without the benefit of codes, licenses, or regulatory enactments concerning the installation and operating of such equipment. Contrary to popular misconceptions, self regulating standards and legislation of this nature were not primarily originated for economic aspects, but for the preservation of life and limb and the public welfare. This principle is emphasized in the NAPRE lead article, starting on page 36. "Codes and Local Ordinances" is a review of the development of Detroit's refrigeration codes and license requirements, a partial history of national standards for the field, and an explanation of the motives behind them.

A BETTER understanding of tellurium-base semi-conducting materials is being sought by technologists at Battelle Institute, Columbus, Ohio. Studies there and in other laboratories suggest that such materials may find use in electronic refrigeration. Particularly interesting is the cooling effect when an electric current is passed through a specially prepared element of bismuth, telluride. Theoretically bismuth telluride has a cooling capacity great enough, if a number of these elements are used together, to liquefy air directly without resorting to compression. The full impact of the applications to refrigeration suggested by this process has not yet been fully realized.

End messy hand purging • *and save money—* with an Armstrong Purger

Here are typical user reports:

PURGER PAID FOR ITSELF IN 30 DAYS at Dalton Ice Company, Dalton, Ga.

HEAD PRESSURE REDUCED 30 LBS. at G. E. Willard ice plant, Doylestown, Pa.

COOLING WATER CONSUMPTION CUT IN HALF at Producers' Dairy Company, Brockton, Mass.

HEAD PRESSURE 50 LBS. LOWER on 90 ton ammonia system at Mayo Hotel, Tulsa, Okla.

WOULDN'T SELL PURGER FOR $1000 says chief engineer of midwestern dairy plant.

$255 AMMONIA SAVING FIRST YEAR says Velvet Freeze Inc., ice cream plant, Kansas City, Mo.

REFRIGERATION COSTS CUT $891 PER MONTH at 1000 ton plant in Havana, Cuba.

HEAD PRESSURE WITHIN 1 LB. OF THEORETICAL at West Coast dairy which pulls down 10 refrigerated trucks twice daily.

ALLOWS TIME FOR DUTIES ELSEWHERE while purging is going on says engineer at Alta Vista Creamery, Fort Worth, Texas.

POWER COSTS CUT 20% at Rubenstein & Son Produce, Inc., Dallas, Texas.

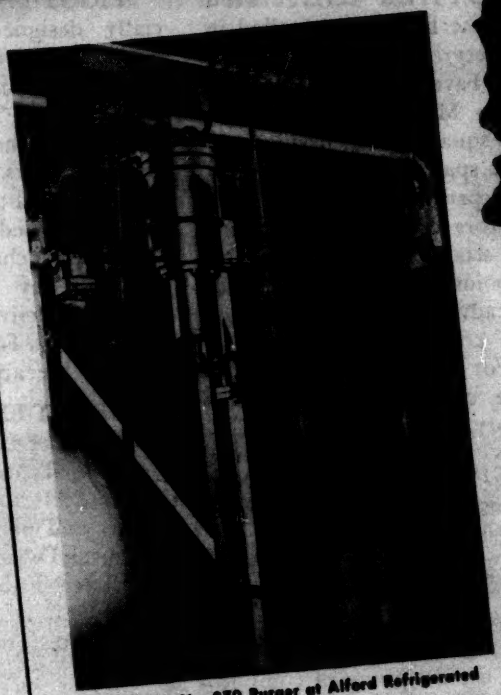
5% GREATER CAPACITY, $250 MONTHLY POWER SAVING at Planters Nut & Chocolate Company, Suffolk, Virginia.

COMPRESSOR CAPACITY RAISED 10% at Gulf Oil Corporation wax plant, Philadelphia, Pa.

$500 ANNUAL AMMONIA SAVING at Howard Johnson Ice Cream Manufacturing Plant, Baltimore, Md.

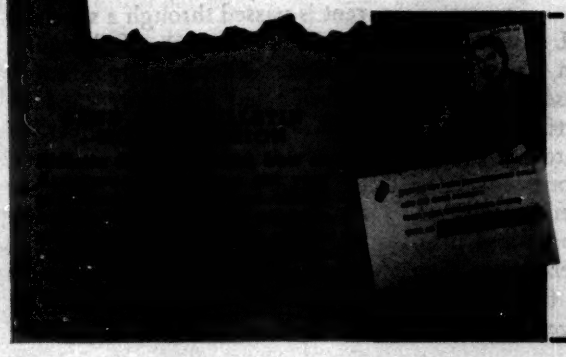
You, too, can say goodbye to messy, bothersome hand purging — and save money besides. An Armstrong Purger *completely* purges a refrigeration system — without wasting a lot of costly refrigerant and smelling up the place. Just turn it on — the rest is automatic.

This *complete* purging eliminates the excess head pressure caused by non-condensables. That's why users save power, get more capacity, and save cooling water.



Armstrong No. 370 Purger at Alford Refrigerated Warehouses, Dallas, Texas.

Armstrong Purger at Brookshire Ice Cream Co., Meridian, Massachusetts.



Armstrong Machine Works
8604 Maple Street
Three Rivers, Michigan

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Refrigerated Warehouse is Installed In Underground Limestone Quarry

AS A RESULT of carefully planned quarrying operations, a vast underground chamber has been realized in the side of a 60-foot limestone bluff at Johnsons, Arkansas, and is known as "Zero Mountain". Blasting and cutting operations were carried on in such a manner as to create a chamber with regularly spaced pillars for maximum support.

Recently considerable attention has been devoted to the utilization of underground chambers for storage purposes. This concentration was the result of the realization that economy could be effected by utilizing nature's ready-made space and fireproofing. In addition, storage space beneath the earth's surface is a strategic factor from the standpoint of National Defense. According to the president of the Zero Mountain development, George Basore, Jr., the cost of refrigeration is only about 30 percent of the above ground cost, and the "all risk" insurance carried by Zero Mountain on its customers' storage is written at a low rate compared to above ground facilities.

23-ft. Ceiling

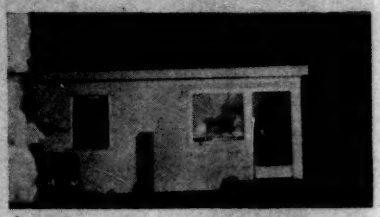
The Zero Mountain chamber has a 23-foot ceiling throughout, blacktopped floor and contains 28,000 square feet of usable food storage space. One section of the 650,000 cubic foot area has been sealed off to form a quick freeze room. Temperature in this section is capable of reaching a low of 40 degrees below zero. The temperature in the storage area proper varies from 2 below zero to about 10 degrees below. The refrigerated air units operated by compressors utilizing a total of 325 hp were installed to provide a clockwise flow of air and thus keep the temperature constant throughout. Seven day recording thermometers are perpetually in operation to give a constant check on temperature maintained.

The present 28,000 square foot chamber utilized only one-fourth of the total area available. Plans to convert the remaining area are as immediate as the demand would arise. These plans include chambers of varying temperatures from the normal 62 degrees provided by nature, in order to accommodate potatoes, citrus fruits, poultry, meat, and any other perishable commodities that are either produced in Northwest Arkansas or desired to be shipped to Zero Mountain for storage.

Zero Mountain is located approximately two miles west of the town of Johnsons, Arkansas (population 100), which is four miles north of Fayetteville (population 17,000) and five miles south of Springdale (population 5,000) in Washington County, Arkansas. Distance to major nearby cities: Fort Smith, Ark., 68 miles; Tulsa, Okla., 98 miles; Kansas City, 300 miles; Springfield, Mo., 99 miles; Joplin, Mo., 69 miles; Little Rock, Ark., 293 miles.

U. S. Highway 71 is two miles east of Johnsons which is served by an all-weather county road. Private roadway from the county road leads to the mouth of the chamber. The existing roadway now handles heavy trucks and excavation equipment. Construction of a 2,000 foot spur on two percent grade is proposed to provide rail service. Frisco has published transit privileges on all basic commodities.

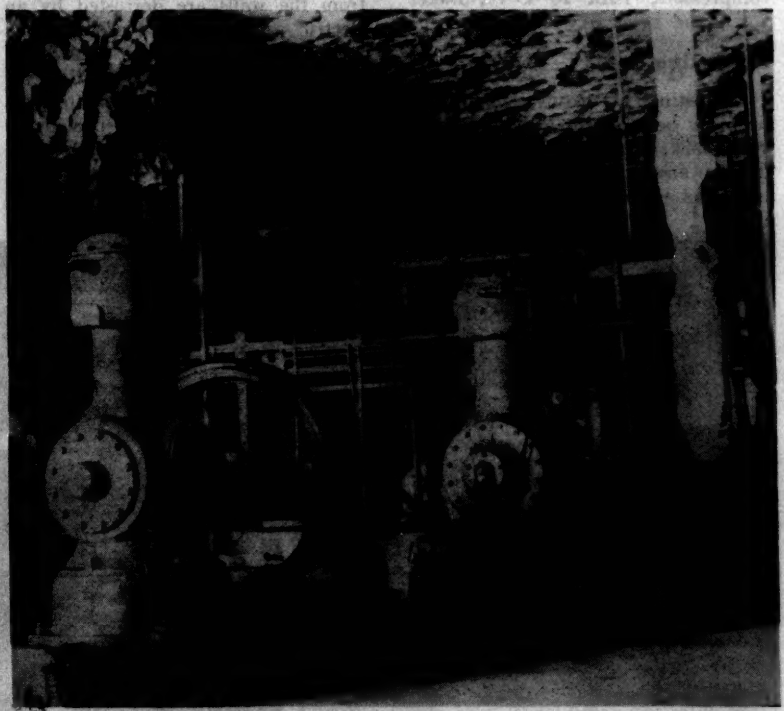
Ultimately about 500,000 square feet can be provided for storage



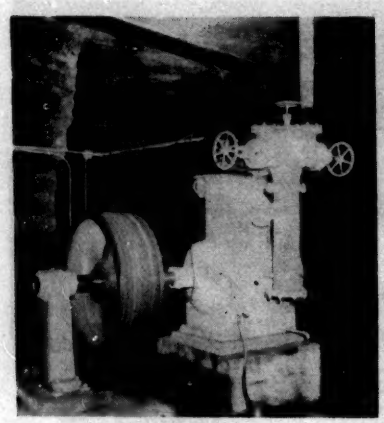
Plant office, looking toward inside of cave.

space. At present, in excess of 100,000 square feet can be sealed off from the continuing quarrying operations and immediately utilized. Ingress is provided by two openings 23 feet in height and 20 to 30 feet wide respectively. Uniform ceiling height is 23-feet. The floor is one level throughout, completely blacktopped.

An 8-inch natural gas line parallels St. Louis-San Francisco Railway Co. (Frisco) right of way, which would require a service line ½ mile in length. A 225 kva bank has been installed to service this project while an additional 75 kva bank is proposed to serve added load. The chamber is completely illuminated.



A view of the engine room shows left to right an 8 x 8 Frick, 10 x 10 York, 7 x 7 Baker — all of these, second stage machines. Not shown in the engine room are four boosters shown in another view.



Frick 11½ x 8 booster, condenser water supply in background

Air unit constructed at Zero Mountain. Unit is twenty-two feet long, not including floor, (10 hp) and contains 500 square feet of two inch pipe coils. A twenty ton Thermostatic expansion valve is used. Swift's Premium Turkeys, frozen here, are stacked in the background. This unit is one of eight used inside the cave.

A completely palletized set-up makes for efficient loading and unloading and transporting to and from storage or sharp freeze.

The latest mechanical equipment is available, including fork-lift trucks capable of attaining 23-foot ceiling height, and lubricated to withstand below zero temperatures.

Engine Room

The engine room is equipped with four boosters, two Frick 11½ x 8 and two 9 x 8 Pennsylvania double acting horizontal boosters. The second stage equipment consists of three compressors, York 10 x 10, Baker 7 x 7 and Frick 8 x 8.

Defrosting

Defrosting at first was quite a problem because the limestone was very moist. However, as the temperature lowered toward zero, this moisture was withdrawn and at present time, walls, ceilings and the floor are quite dry. Defrosting is done in two ways. Air units which are located close to the partition walls are defrosted with warm water piped from vertical condensers sump. Water drains back through pipes to the water supply, which is adjacent to the engine room.

Air units located any distance from the walls are defrosted by an electric water heating system, which is portable. This system consists of a water tank, three feet in diameter and three feet high, mounted on skids so it can be transported by fork truck. Two seven-thousand-five-hundred watt electric heaters add heat to the water, which in turn, is pumped over air unit coils by water pump mounted on a water tank. This pump is connected to air unit water headers by an inch-and-a-quarter rubber hose and quick disconnect couplings. Air units are mounted on foundations four feet above the floor so that this defrosting unit can be set under the drain pan. Water from melting ice drains back into the water heating tank where it is reheated and re-circulated over the coils. Three phase four-hundred-forty volt power is supplied at each air unit. Defrosting unit is simply plugged into the safety receptacles.

A portion of the cave floor was dynamited to form a basin for the water supply which covers an area

Backing into the entrance, this truck prepares to unload commodities for storage. At right, dressed turkeys are being placed in deep freeze section.

Typical air handling unit for storage areas in Zero Mountain unit is raised above floor to permit water defrost tank being placed under it during defrost operations.

Inside the storage area, temperature, minus 2 F. Swift's Premium Turkeys stacked on pallets.

of approximately one-half an acre. It has water about eight feet deep. Part of this area extends outside the cave where a spray pond has been constructed. It is only necessary to operate the spray pond in the Spring, Summer and early Fall, because the water trickling through an unused part of the cave is cooled by the large mass of limestone which it flows over. This cool water is, of course, pumped over two condensers. It is not known whether or not this mass of limestone will be warmed up by the constant addition of heat liberated from condensers. It is the same theory as burying condenser pipes under the ground. Pond water level is maintained and kept fresh by a spring which flows the year round. This spring also supplies drinking water which has been approved by the State Board of Health.

Portions of the wall constructed to seal off that area of the cave to be used as the warehouse are built from column to column enclosing a rectangular-like area. Construction was as follows:

Welded Steel Studs

Welded steel studs similar to a ladder were set in holes drilled in solid rock floor. On the top side, telescoping members were raised into holes drilled in the rock ceiling. These sliding or telescoping pipe members were then welded so as to form a rigid steel stud eighteen inches wide from floor to ceiling. These studs were placed on eight foot centers running from column to column. Next the studs were braced by welding inch-and-one-quarter pipe from stud to stud. Steel-tex, a paper backed wire netting was wired to the studs on both sides, wire side of Steel-tex out. This formed a double wall with an air space of eighteen inches, or the width of the ladder shaped studs. Concrete was sprayed on to the Steel-tex by the "Jet Crete process". This concrete, about three inches thick, was sprayed on both sides of the wall form which was set up to form a rigid partition with an eighteen inch air space. This space was later blown full of insulation through port holes left open at the inside top of the partition wall.

The industrial engineer who foresaw the possibilities and planned the plant's machinery for maintaining and regulating selective temperature is George Basore Jr., graduate from the University of Arkansas, who was connected with the Frick Company, manufacturing concern. He made installations of the refrigerating equipment and other strategically placed units of the plant, from the engine room to the entrances that connect with paved highways.

Garden State Plaza Shopping Center Cooled by Powerful Centrifugal Compressors

FOUR giant capacity compressors provide 9000 tons of cooling for the mammoth 110 acre Garden State Plaza Shopping Center in Paramus, N.J., which opened May 1. Said to be the most powerful air conditioning compressors ever built, these four 2250-ton York "Freon-12" centrifugal compressors in the engine room of the ultra-modern Bamberger's Paramus store at the project's center, will form the heart of one of the world's largest air conditioning systems.

Prior to opening of the Garden State Center, the world's most powerful air conditioning compressors were reported to be the 2200-ton York machines installed a year ago to cool the United States Capitol in Washington as well as six other government buildings in the Capitol complex. Capacity of the Garden State plant is the equivalent of cooling four 20-story office buildings or 4500 six-room houses. If the yearly Btu cooling capacity were converted to an equal amount of ice, it would provide enough one-cubic foot blocks of ice to reach from Paramus to Los Angeles, California.

The Garden State air conditioning compressors are far from the largest ever built. They are comparatively small in their physical dimensions, due to design improvements by their creators, the York Corporation, subsidiary of Borg-Warner. Whereas each of these "Freon-12" machines weighs 9200 pounds, two "Freon-11" machines with the same capacity would weigh 44,000 pounds, and the "Freon-11" compressors would each be about two and one half times the size of the Garden State compressors.

The centrally located engine room with its compressors, evaporators and condensers, will chill water for distribution to air handling units which are located close to the spaces to be cooled. By this method, the designer has kept all refrigeration equipment in one area, insuring easier maintenance through the efforts of one operating crew.

Research and Other Refrigeration Developments Reviewed in TRRF Bulletin

THE June issue of the TRRF Information Bulletin featured four specific headings over a spread of eight pages and contained considerable data of interest to not only the refrigerated warehousing but other allied industries. Four sections covered the topics of TRRF research, functional containers for refrigerated storage, a review of recent technical publications, and industrial notes on some eight specific topics.

In the Bulletin, Director H. C. Diehl, reviewed the increasing action taking place in both continued study and application of the findings from the time-temperature tolerances research. Also reported on were irradiation, frost formation, controlled atmosphere for fruits, peanut and pecan projects; all of which are being aided at various universities and experimental stations by TRRF grants. The Bulletin also carried an announcement of the increase in price in the Foundation's Commodity Storage Manual.

Under the heading of functional containers, the Bulletin not only reported on packaging progress and non-fogging cellophane, but summarized a report on corrosion of canning metals. A report by three can manufacturing research men shows that in spite of improvements in can making materials, dried prunes in sirup are highly corrosive and the life of the canned packs varies. The Bulletin also reported on the 1957 findings of canned food cached during the Antarctic expedition 46 years ago. Meat, milk, jam and beans were found to be edible and no corrosion had taken place on the container interiors, held for this number of years at sub-zero temperature.

Technical Abstracts

Among the recent technical publications abstracted in the June Bulletin were articles on the antibiotic treatment of oysters; freeze dehydration of meats, oiled eggs, and poultry immersion freezing. Shipping publications were listed and a review on mechanically refrigerated car for cranberries was given. A lengthier summary was given on a jacketed room system for cool storage of celery. The Director added a specific comment to the summary on antibiotic treatment.

Industry notes included a review of an article appearing in a food publication which was authored by the president of one of the leading refrigerated warehouse industries. The introduction of mobile vacuum coolers manufactured by an eastern firm as reported on in a packaging publication, was also summarized. The Bulletin contained some suggestions on where to find new storage business, as well as two personal items dealing with the promotion of Mack Hunt, TRRF Assistant Treasurer, and the bestowing of an honorary Doctor's degree on the Foundation Director. Other honors bestowed in the past few weeks preceding the June Bulletin, went to Dr. Roy C. Newton, vice-president, Swift and Company, by the American Institute of Chemists; to Dr. Paul Harding, from the USDA; and to William Dalton, executive vice-president, NARW, from the National Prepared Food Processors Association.

Other industry notes included data on pallet load tying devices, a floor sweeper and paint remover. An article from a talk by Henry B. duPont at the Clarkson University was excerpted. It dealt with the extra profits from technology.

New Orleans Warehouse Adds Space

Architect's sketch of new warehouse of New Orleans Cold Storage and Warehouse Company.

ANOTHER 1,300,000 cubic feet of refrigerated space was added by the New Orleans Cold Storage & Warehouse Company when it opened its new Airline Highway Warehouse in Jefferson Parish just 15 minutes from downtown New Orleans. Already operating 1,500,000 cubic feet in the city of New Orleans itself, the firm now offers the additional space to food processors and distributors who intend to keep pace with expanding population and the economic growth of the South. The plant was dedicated at a formal opening on June 21 and opened its entire warehouse service facilities for business on July 22.

The new plant, which covers approximately six acres of the 17-acre tract, consists of 12 refrigerated rooms with a combined capacity of 20,000,000 pounds in both cooler and freezer space. It is equipped with a 100,000 lbs. per day capacity blast freezer which operates at minus 35 F. The refrigerating equipment is by York Corporation, subsidiary of the Borg Warner Corporation.

Product handling in and out of the new plant is by palletized truck operation. The plant has a car height dock and siding to accommodate 15 rail cars across one longitudinal side. On the opposite side is a door height truck dock with a 75-foot concrete apron. Loading and unloading platforms are fully enclosed, assuring all weather protection of products.

Future plans of the company include development of their tract to accommodate industries which are allied or associated with food processing and the refrigerated warehouse fields. August Perez and Associates were the architects; A. R. Salzer and Associates, mechanical engineers; L. N. Goodman, electrical consultant; George Schrenk, structural engineer, and Paul Christensen, refrigeration consultant. The R. P. Farnsworth Company, Inc., were general contractors and the Reilly-Benton Co., were the insulating engineers.

Officers

Officers of the 53-year old company are William Garic, chairman of the board and president; George G. Westfeldt, vice-president; H. L. "Jimmy" Brooks, vice-president and general manager; Lawrence A. Molony, secretary; Calvin P. Judkins, treasurer, and Joseph W. Montgomery, Perle Mackie and A. F. Sanchez, directors.

ASRE Annual Meeting – Technical Sessions and Conferences–Officers Elected

FOUR technical sessions, three methods conferences and six round table forums, plus the election of new officers and directors, occupied the time and attention of some 450 registrants at the American Society of Refrigerating Engineers, 53rd Annual Meeting, Miami Beach, Fla., June 1 to 5, 1957.

Officers Elected

Officers elected for the 1957-'58 term include: President, H. F. Spoehrer, vice-president and treasurer, Sporlan Valve Co., St. Louis, Mo.; 1st-Vice-President, Cecil Boling, president, Dunham-Bush, Inc., W. Hartford, Conn.; 2nd Vice-President, D. D. Wile, vice-president, Recold Corporation, Los Angeles, Calif.; Treasurer, George K. Iwashita, vice-president and general manager, Standard-Knapp Div., Emhart Mfg. Co.

Thirteen technical papers were presented by leading engineers during the four technical sessions. Among the topics were such subjects as methods of improving food preservation in home refrigerators, heat and vapor movement on refrigerated goods, and a centrifugal refrigeration compressor for aircraft. Other papers were on: techniques, processes and methods allied with extremely low temperatures; heat transfer rates; capillaries and insulation; refrigerant drying and automatic defrosting.

The three conferences concerned themselves with domestic refrigerators, air conditioning, and contaminants. The refrigerator conference dealt principally with size, shape and appearance of refrigerators and freezers, whether built in or not, and how they fit into the overall plan for the modern kitchen. The air conditioning presentation discussed reduction of residential heating and cooling costs, while the contaminants conference tackled the considerations allied with refrigerants, electrical insulation, hermetic units and assemblies. Forums covered such topics as sources of noise and methods to reduce them, electrical requirements, control of cooling cycle, reverse cycle units and automotive air conditioning.

A number of technical papers presented contained data of interest to engineers and management in the industrial refrigeration and large commercial refrigeration field.

Refrigerated Packaged Goods

In the food freezing, cold storage and refrigerated transportation fields, a paper by E. K. Heaton, Georgia Experiment Sta., C. F. Kayan, Columbia University, J. G. Woodruff, University of Georgia, on refrigerated packaged goods would be of interest to those concerned with the formation of moisture on commodity wrappers during warm-up or movement through higher temperature areas.

In this paper, an effort is made to trace the heat flow and formation of moisture on packaged goods, during warming up, with consideration given to mechanisms of direct conduction, inter-surface radiation and internal natural convection. Results are applicable to an understanding of condensation problem with all packaged goods moved from lower to a higher temperature, including warehousing or transport by rail, truck, steamship or airplane. Condensation varied with the density of the products handled, and could be prevented by protective packaging; that is, by a sealed moisture barrier in the package wall. It was further shown that canned goods could be removed directly from Zero to 90 F, provided the package wall was impervious to vapor pressure.

Latent Heat Source for Automatic Defrosting

In a paper on Latent Heat Source for Automatic Defrosting, Otto J. Nussbaum, Kramer Trenton Co., said that field experience with various types of heat sources point out certain indispensable requirements which must be met by an adequate automatic defrost system; mainly, that defrost must take place promptly without compressor overload and independently of season. The latent heat re-evaporator attains these requirements by providing an ample heat reservoir at a constant low temperature level; yet it occupies less space than a sensible heat source of equal capacity. The latent heat re-evaporator is used in two embodiments: first, the series hookup; and second, the bypass hookup. Series hookup can be applied to small capacities and a limited range of refrigerant temperatures. Bypass hookup is used for large capacities, ultra-low temperatures and fresh food storage.

Energy-Flow Analysis Via Resistance Concept

A paper by C. F. Kayan, Columbia University, on Energy-Flow Analysis via Resistance Concept reported the results of another phase of the investigations supported in part by grants-in-aid to Columbia University from The Refrigeration Research Foundation and the American Society of Refrigerating Engineers. In space-refrigeration installations, the insulated structure, such as a cold-storage enclosure, comprises one phase of an energy-flow circuit. This problem can be set up on an analog computer, where, with proper values applied, current flow is measured and converted to heat flow. Often the structure heat inflow from the outside may be augmented by other energy sources, such as electrical internally-released energy of power and light, and of warm loads brought in from the outside. There may be other loads due to human occupancy and to ventilation provisions.

Another important phase of the energy-flow circuit is represented by the refrigeration plant. This serves to remove the inflow heat from the refrigerated space, and to dissipate it ultimately to some medium of the atmosphere, through, for example, a condenser served by circulating cooling water. The heat absorbed from the cooled space moves along the circuit through a series of processes. The structure-heat may be transferred from the space-air to circulating brine; from the brine it passes to a refrigerant in a brine-chiller or evaporator; then, through the agency of a compressor or other "heat-pump" equipment, it is transported up the temperature scale to the condenser of the system, to be finally dissipated to the condenser coolant, along with the mechanical work of energy-transport in the heat-pump machine. All can be plotted and calculated by the electrical resistance concept.

Electrical Insulation And the Hermetic Motor

In a paper on Electric Insulation and the Hermetic Motor R. T.

Divers, Materials Engineer, Carrier Corp., reported that developments in hermetic motor insulation will probably depend largely on changes in operating conditions brought about by the use of new refrigerants. Completely embedding the motor winding of a small hermetic motor in an impervious plastic medium, has been explored as a possible solution to the problem of isolating the insulation system from the adverse effects of the refrigerant, water, oil, and metal particle atmosphere. Some of the advantages of direct gas cooling the windings can be retained by filling this plastic material with fine particles of a good thermal conductor.

In large hermetic systems, high voltage operational advantages will certainly lead to motors of 2300- and 4600-volts which will require insulation systems superior to anything known presently. Insulating materials used in hermetic motors must have good solvent resistance. That is, they must not be softened or altered by the refrigerant liquids or vapors used to cool them. Thermal stability will be necessary, of course, but with the relatively low temperatures at which refrigerants become unstable, this will not be of primary concern.

The Molecular Sieve A Refrigerant Desiccant

A paper was presented on The Molecular Sieve A Refrigerant Desiccant by H. Lautensack, F. M. O'Connor, and M. L. Suval, Linde Air Products Co. As reported on in *Refrigeration Service and Contracting*, January 1957, and other trade journals, molecular sieves are selective absorbents that have a high affinity for water. They have a high water capacity at temperatures as high as 140 F and at water concentrations as low as 10 ppm. Due to a molecular size effect, both Refrigerant-12 and Refrigerant-22 and oil are excluded from molecular sieves; thus, the absorbent volume is used only for water adsorption, and performance is not affected by the presence of oil.

Water capacities of molecular sieves are 5 to 10 times greater than for other adsorbents. Drier manufacturers can offer a smaller cartridge for drying refrigeration systems and preventing freeze-up. A smaller drier cartridge can offer economic advantages in those applications where space is of critical importance, e.g. the automobile air conditioner. The high water capacity of Molecular Sieves could permit using this desiccant to dry the units after the refrigeration systems are assembled. This would allow compressor manufacturers to retain their present day drier cartridge and eliminate the costly and time-consuming compressor drying operation. Additionally, with water capacity being practically unaffected by the presence of oil, a Molecular Sieve drier cartridge possibly could be placed in the compressor housing.

Refrigeration Apparatus For Low Temperatures

E. T. Wessel, Metallurgy Department, Westinghouse Electric Corp., presented a paper on Refrigeration Apparatus for Low Temperatures. General usefulness of low temperature mechanical testing equipment was illustrated by brief summaries of studies of the behavior of mild steel, a hardened alloy steel, nickel, aluminum, and copper under load at low temperatures. Conventional tensile properties over a wide range of subzero temperatures are illustrated. Apparatus and techniques which provide refrigeration for purposes of mechanical testing anywhere in the temperature range from room temperature to minus 452 F are described. Two similar systems employing liquid nitrogen (from 75 to minus 320 F) and liquid helium (from minus 320 to minus 452 F) are used. The apparatus is relatively small, simple, and economical to operate. Although currently limited to special experimental applications, it is believed that the basic principles and techniques which are employed may be applicable to larger more complex systems on a commercial scale.

Hydrogen Liquefaction By Dual Pressure Process

A paper on Hydrogen Liquefaction by Dual Pressure Process by Dudley B. Chelton, John Machinko, and John W. Dean, Cryogenic Engineering Lab., National Bureau of Standards, pointed out that increased activities in cryogenic engineering have brought about the need for larger and more economical liquefaction plants. Choice of a system to liquefy hydrogen must be justified by comparison with alternative systems. Although a thermodynamic comparison is of prime importance, the choice of system does not rest entirely on such a comparison. Other factors that enter into the selection of the most practical system are initial cost, reliability and maintenance. By a dual pressure process liquid hydrogen can be produced economically and simply. At optimum conditions the energy required to liquefy hydrogen by this method is 2.44 hp/hr per gal while operating with an expansion valve and 1.78 hp/hr per gal while operating with an expansion engine.

Mechanical Refrigeration for Storage of Liquid Hydrogen

B. W. Birmingham, Cryogenic Engineering Lab., National Bureau of Standards, presented a paper on Mechanical Refrigeration Storage of Liquid Hydrogen. He said that large scale production of liquid hydrogen has increased the importance of efficient storage and transport vessels for this relatively expensive liquid. Some large and reasonable efficient transportable liquid hydrogen vessels, known as dewar vessels after the inventor, James Dewar, have been built during the past few years. These large dewars are well insulated; however, some heat is transferred even through the best available insulations causing the evaporation of and consequent loss of liquid hydrogen.

For reasons of economy it is desirable to store liquid hydrogen without loss. In such a case a refrigerator is required. The refrigerator must be capable of providing refrigeration at a rate equal to, or in excess of, the heat transfer rate to the dewar. A mechanical refrigerator for the no-loss storage of liquid hydrogen has been developed by the Cryogenic Engineering Laboratory of the National Bureau of Standards.

NOTE: Reprints of papers described in this summary are available.

Supermarkets Increase Volume of Food Sales

REPORTING in the June-July 1957 issue of the DuPont Magazine, Robert W. Mueller, staff correspondent, reports that supermarkets now take in two out of every three dollars spent on retail foods. Yet, supermarkets actually represent less than one in ten, in numbers of food stores throughout the United States. Self-service of prepackaged foods is not only proving popular with the American consumer according to Mueller, but he also notes the 24-hour service success of a Houston drive-in market. Practically all items in the Houston store are offered through vending machines lined up along the drive-way through the market and accessible from the purchaser's automobile. He also cites a New Jersey market with the same idea of vending machines arranged outside the market.

"Piggy-Back" Unit Delivers Bulk Crushed Ice

MAXIMUM economy in everyday delivery of up to six tons of crushed ice for produce refrigeration has been developed by the Colorado Ice and Cold Storage Company, Denver, Colorado, with the novel delivery unit, pictured here.

Developed on the basis of practical experience, the delivery body, as shown, consists of two 10-foot-long galvanized metal tubs mounted on heavy steel caster wheels which ride atop a flat bed three-ton truck. Channel-type tracks with a wedge-shaped flare at the rear edge of the truck bed provide for easy rolling of up to two tons of ice on and off of the flat bed in a few minutes time, and lock the separately wheeled carriers tightly in place while in use.

One of the Colorado Ice & Fuel delivery trucks with tanks specially designed for delivering bulk crushed ice

Need Foreseen

The need for this versatile type of delivery system first arose five years ago, according to Henry Williams, ice delivery foreman, when Colorado Ice and Cold Storage began supplying the huge 11 million dollar foods warehouse of Safeway Stores, near Denver. Included in the workload was a heavy demand for crushed ice in the fresh produce department, which handles upwards of 25 tons of perishable "green goods" per day.

In order to supply the amount of crushed ice necessary for refrigerating so heavy a volume of produce, the company made use of bulk delivery, sacked crushed ice, and similar methods, but found drawbacks existed in each. Cartoned or sacked ice, for example, while it cut down somewhat on the handling load, meant a waste of time in opening the sack, and often the amounts involved made bulk ice more desirable. What was needed, according to Mr. Williams, was some means of carrying larger amounts of crushed ice in bulk, but capable of being easily transported from the Safeway Store's loading dock to the point of use.

Piggy-Back Unit

The "piggy back" unit, pictured above, was the result, developed after much testing. As shown, the unit consists of heavy galvanized metal tubs, 9 feet long, 24 inches deep, and 30 inches high, which roll on four 8-inch heavy steel, broad-rimmed caster wheels. Mounted on a heavy channel steel box frame, with reinforcing members around the sides and top of the galvanized metal tubs, the tubs will easily accommodate up to one ton of crushed ice. A hitch at either end provides for fork-lift or tug pulling of the tank from one place to another over the concrete floors of the warehouse, as desired.

Crushed Ice Blown In

In everyday operation, the units are simply blown full of crushed ice at Colorado Ice and Cold Storage Company's loading dock and shuttled a distance of approximately five miles to the Safeway Stores produce building dock. There are six of the steel tubs which are operated on an "exchange basis," filled containers dropped off at the dock and towed into the produce area while empties replaced them on the body for transfer back to the ice plant. An almost-hourly telephone check is made through the day to determine the amount of ice used, which often rises to six tons per day requiring three trips from loading dock to the produce building.

Tracks Adjustable

The wedge shaped tracks at the rear of the truck are adjustable, up or down to compensate for such factors as a heavy crust of ice on the driveway at either point, ice delivery to other points, such as the Maplecrest poultry distributing organization, likewise served by Colorado Ice and Cold Storage, etc. In transit, heavy 10-inch sections of steel pipe bolted firmly into the track prevent any danger of the tubs rolling off of the truck bed.

With this plan, crushed ice can be delivered to the produce storage boxes in less than half of the time formerly required, and the ability to "spot the ice exactly where it is needed" has substantially increased crushed ice sales, according to Mr. Williams.

Milwaukee Extends Car Icing Facilities

RAILROAD car icing facilities of the Milwaukee Road have been extended, according to a release in July by the railroad's News Bureau. A 60-car icing facility, consisting of a platform 1500 feet long has been constructed at the railroad's recently acquired property at Othello, Washington, 125 miles West of Spokane. The railroad recently completed, at the cost of approximately one million dollars, a new 11 track freight line for about 660 cars with suitable connections with the CMStP&Pac.'s transcontinental line.

The icing facilities include a 2200-ton refrigerated ice storage building and mechanical conveyors for moving ice into and out of the building. The icing platform, constructed between two of the tracks, is equipped with car icing machinery which picks up the ice from a chain conveyor, and crushes it to suitable size for the commodity being iced and loads the refrigerator car bunkers. The 60-car facility ices cars at the rate of one car each two minutes.

According to the Chicago, Milwaukee, St. Paul and Pacific Railroad Company release, the railroad moves out 4800 carloads of potatoes in the Columbia River Basin irrigation area.

Soft Drink Industry Salutes Refrigeration

THE soft drink industry, celebrating its 150th birthday this year, salutes the Refrigeration industry, which has materially contributed to its progress since the early days. One hundred and fifty years has seen the carbonated beverage business grow from a one man operation into a billion dollar mechanized enterprise.

Refrigeration is one of the key words in the soft drink industry and will be in the minds of thousands of bottlers who attend the 1957 International Soft Drink Industry Exposition, November 11-14, in Washington, D.C. On hand to demonstrate their products will be manufacturers of beverage coolers as well as water cooling equipment necessary in the production of soft drinks. The beverage coolers, used in the sale of the product, are used with electricity, or ice, some are portable and most are coin controlled.

The National Guard Armory, scene of the Exposition, is expected to be sold out space-wise. Already 189 concerns with products for the soft drink industry have made reservations, accounting for more than 90 percent of available space in the two-level hall. Concerns wishing information on available space should contact the American Bottlers of Carbonated Beverages, 1128 Sixteenth Street N.W., Washington, D.C.

Looking into the future, the soft drink industry and its suppliers will grow together, said Edwin F. Wagner, president of the American Bottlers of Carbonated Beverages. He predicted that by 1967 the American public will be consuming close to 40 billion bottles of carbonated beverages each year. By 1967 he expects the wholesale value of the annual production of the bottled soft drink industry to exceed $1,700,000,000.

He based this estimate on the growing production trend in the country, the increase of leisure time, a rapidly growing population, and the Soft Drink Industry Exposition, which is constantly stimulating change and improvements in the equipment and other things used in the business. He pointed out that the exposition is one of the few in the country created and sponsored by the customer for the supplier. Every year sees hundreds of exhibitors of products and services for the soft drink industry displaying at the event, which in 1957 will be held in the Nation's Capital, November 11-14.

Hotel Air Conditioning Gains in New York

THE NUMBER of air-conditioned rooms in New York City hotels now totals more than 25,000, more than double the number of air-conditioned rooms available on July 1 last year, James A. McCarthy, executive vice-president of the Hotel Association of New York City, Inc., reported.

In 1956 city hotels spent more than $30,000,000 on a major transformation and modernization program, Mr. McCarthy said. This year they will spend an additional $20,000,000 to complete many portions of the program that was launched in 1956. The major portion of the estimated $50,000,000 expenditure in the two years has been for the installation of air-conditioning equipment.

Door Curtain For Refrigerated Trucks

A MEANS of maintaining cold temperatures inside refrigerated delivery trucks during hot weather has been developed by the USDA Marketing Research department. A new plastic door curtain, which is mounted just inside rear door of trucks has proved successful in maintaining frozen conditions of products in trucks. Curtain slows down escape of cold air when door is open during deliveries, and at same time prevents hot outside air from entering. It helps prevent cold plates of truck from dripping, saves on product damage and deterioration, and reduces cost of refrigeration.

Water Freezes at Minus 40, or at Plus 32 F?

ACCORDING to a Stanford Research Institute Bulletin, small waterdroplets suspended in the atmosphere can be cooled as much as minus 40 C (minus 40 F) without freezing "unless an interaction occurs with certain foreign particles called freezing nuclei". This information comes as a jolt to most engineers who accepted the long established custom of figuring the freezing point of water at 32 F.

The article in the Stanford Bulletin was actually describing a generator used for producing silver iodide crystals. These crystals were used as the freezing nuclei for experimental work on a mechanism for exploring the interaction of foreign particles with water. The bulletin did not indicate whether or not the study had any immediate application for various industries concerned with the amount of water contained in the atmosphere.

Poster Drives Home Points in Southland Safety Meeting

This group of employes of the Ice Department at Temple, Texas hear a safety lecture by W. F. Leonard, Jr., aided by a poster.

A SAFETY meeting held by the Southland Corporation at Temple, Texas attracted more than usual interest. The ice department of this plant is managed by M. R. Rogers. There are seven employees, with a total of 63 years service with the company. These employees represent a total of 165,494 accident-free man hours and 635,000 accident-free vehicle miles. In the picture above, W. F. Leonard, Jr., director of safety for Southland demonstrates a point, with the aid of a safety poster.

View of Goodyear's Chemigum plant at Akron, Ohio. The refrigerating machines are in the building at the left

New Synthetic Rubber and Plastics Plant Has Specialized Refrigerating System

ONE of the most versatile of plants for making synthetic rubber and plastics has lately been completed at Akron, Ohio, for the Chemical Division of the Goodyear Tire and Rubber Company. Known as the "Chemigum" plant, this installation has several batteries of large reactors, equipped to handle the making of both synthetic rubber and plastic compounds.

Each reactor measures approximately 75 inches in diameter by 14 feet in height, and has a capacity of approximately 3000 gallons. The reactor room presents an impressive sight: there is an elaborate system of piping for the raw and finished materials, along with the air and electric controls used for filling, emptying and controlling the reactor temperatures. These temperatures may vary from 40 F to as high as 140 F.

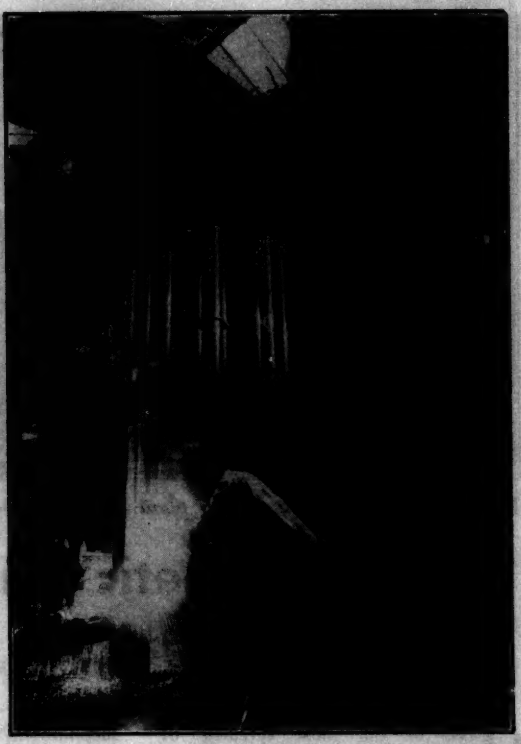
The reactors are glass-coated inside, as are also the agitators and the cooling coils. The glass is fused on these parts while at a temperature of about 1750 F, which is "cherry red". This special finish was applied by the Glascote Products Co. of Cleveland, who also supplied the reactor vessels. All metal parts covered with glass are required to have a carbon content of less than 0.20 per cent in order to insure the proper bond with the glass under varying temperatures.

Direct-expansion ammonia is used throughout this cooling process, which is under full-automatic control. All motors, starters and control mechanisms are explosion-proof, even including the electric-light sockets and extension cords. A complete fire-fighting system is installed.

Ammonia Compressors

There are four two-cylinder 12 by 12 Frick ammonia compressors to handle the main refrigerating load, and a 5 by 5 compressor intended for pump-out service. It has been found that under conditions of light load this pump-out compresor could handle a reactor carrying on a hot reaction, and it has accordingly enjoyed considerable use. The large compressors are driven through static-conducting V-belts by Louis Allis totally-enclosed fan-cooled explosion-proof motors of 200 hp each. These compressors have fully-automatic capacity controls. This regulating system is so sensitive that when the suction pressure varies as much as two pounds it will operate the capacity controls on the various compressors in a series of steps. Two of these compressors have automatic starting unloaders, including pilot-operated valves. The motors are

The four Frick 12 by 12 ammonia compressors which carry the main cooling load, seen from the front.



Above: Driving side of the compressors, showing automatic starting and capacity controls, and Louis Allis explosion-proof motors of 200 hp. each. Right: Welding the patented Frick direct-expansion coils, which were coated with glass before being installed inside the reactor.

started directly across the 440-volt lines. There is a special vault containing the transformers, starters and other controls.

Each of the reactors has seven banks of vertical flooded cooling coils, with horseshoe-shaped headers for both suction and feed at the top, all being part of the patented Frick design (Patent No. 2,764,476). Special precautions were taken to have all corners of these coils and headers rounded, to facilitate coating with glass. Polished stainless-steel bolts, studs and nuts were used. The ammonia liquid feed to these coils is a combination of float valves and Foxboro pneumatic valves, giving close temperature regulation. The suction from each coil is handled by means of a Hubbell back-pressure valve with an air diaphragm for still closer control. The process is usually continuous over a number of hours, and the plant often operates seven days each week.

The ammonia suction main of this system is 8 inches in size, and the liquid main is three inches. The condensing system, which is mounted outside in a special structural-steel framework, presents an impressive sight. It consists of two desuperheaters for condensing any oil vapor in the ammonia without condensing any ammonia. This cooled discharge gas then passes through two oil traps. There are four multipass shell-and-tube condensers, each 18 ft. long, and a 48-in. dia. by 18-ft. ammonia receiver. Each of these vessels is equipped with two type AF safety-relief valves, mounted above a dual-outlet valve.

Any liquid ammonia returning in the suction main is trapped by a 60-in. by 9-ft. accumulator, located above the engine room roof. This accumulator contains approximately 1000 feet of extra-heavy coils, through which the warm high-pressure liquid ammonia passes on its way from the receiver to the reactor coils. Any cold liquid trapped in the accumulator and not evaporated by the coil is returned to the receiver by a two-stage Frick timed-gear liquid refrigerant pump.

The control boards, which are installed in both the engine room and the reactor room, contain all the necessary indicating and recording gauges for pressure and temperature, with red and green indicating lights, relays and alarms.

Booth Fisheries Sets Sales Record But Prices Drop

BOOTH Fisheries Co. in the fiscal year ended April 27, 1957 had the largest sales in its history but net income was squeezed to a second best position. Net sales and other revenues totaled $46,715,004 against $43,756,647 in the preceding year. Net income of $725,627, or $2.29 a share, compared with $801,895, or $2.54 a share in 1956.

R. P. Fletcher Jr., president, wrote stockholders that prices for the company's end products had not been able to keep abreast of rising costs of materials, supplies, wages and salaries. He said the company had turned to "convenience" foods as the way to larger sales and profits.

Last year the firm introduced individually frozen, peeled and deveined shrimp in both institutional and consumer sized packages. Also introduced were French fried shrimp in the U. S. market and "fish and chips" in the Canadian market. Fletcher said the increasing demand and large potential for convenience type foods warrants further experiments and testing in this field.

The report disclosed the company discontinued the distribution of frozen fruits and vegetables under the Booth label last February so that its facilities and production techniques could be more profitably utilized on fish and seafood.

Minimum Wage Law Hits Small Business Concerns

THE Small Business Administration in its semiannual report emphasizes the effects of "raising of the Minimum wage by law" as an important factor in the 1956 increase in small business failures. The report points out that "where a big employer has raised wages in response to union demands, smaller business in the local area finds it difficult to compete for labor".

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ZERO PERM* VAPOR BARRIER

reduces vapor transmission to a practical zero

ZERO PERM is formed from 1-mil aluminum with ½-mil Du Pont polyester "Mylar" film permanently laminated to each side. This combines the virtually perfect vapor proof quality of aluminum with the tough flexibility of "Mylar"—offering complete permanent protection against vapor leaks. Joints are sealed with ZERO PERM Pressure Sensitive Tape. In effect, this forms a single unbroken vapor barrier sheet enclosing the entire room, which may be inspected before insulation is applied.

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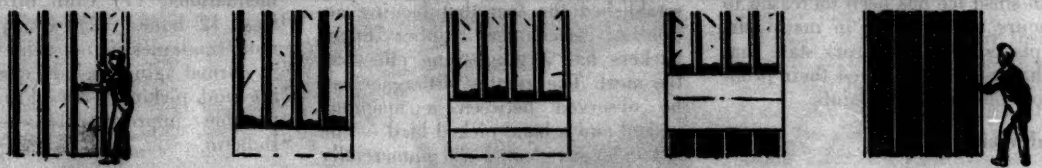
VOID-FREE PALCO WOOL* INSULATION

reduces heat transmission to a minimum

PALCO WOOL is a natural corkscrew-like redwood bark fiber with the inherent resilience to stay in place without support so entire wall may be inspected to eliminate possibility of voids or pockets. At recommended density of 4.5 lbs./cu. ft., it displaces so much air that convection currents are virtually eliminated. Impervious to moisture effects and deterioration, it has no vapor dams to trap moisture and lower efficiency. Snug fit around all structural members eliminates joints and edge leaks. Application of interior finish is completely independent of insulation placement.

Complete open wall inspection

FULL INSPECTION ELIMINATES HUMAN ERRORS IN APPLICATION OF VAPOR SEAL AND INSULATION



1. ZERO PERM Vapor Barrier is completely installed before insulation is applied, allowing full inspection to eliminate vapor leaks.

2. *Palco Wool* is packed behind temporary retainer sheet at bottom of wall.

3. *Palco Wool* is packed behind second temporary retainer sheet.

4. Lower temporary sheet is removed, placed above second sheet, and packing process is continued. Process is repeated until entire wall is packed.

5. As temporary sheets are removed, wall is inspected to determine that there are no pockets, voids, settlement. Interior finish is then applied.

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Please send me, without obligation:

- ☐ Complete Refrigeration Insulation Manual
- ☐ Sample of *Palco Wool* Insulation
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Research on Tenderizing Frozen Poultry

AN IMPORTANT piece of research work on tenderizing frozen poultry has been accomplished by A. A. Klose and Hans Lineweaver at the USDA Western Branch in Albany, Calif. And they have done a good job in getting their findings to industrial plants through cooperation to the trade press. A summary of this most recent report includes the following:

The most important factor is tenderness, and the easiest one to control is the amount of time the carcass is held in a chilled or unfrozen state before cooking. Changes in practice over the past several years have tended to minimize the period of aging before freezing. These changes have included shorter periods in slush ice, more rapid freezing, and the growing practice of cooking from the frozen state, or with only short thawing.

The need for some aging was established years ago, but the time required, until recent years, was always less than the time consumed at chill temperatures in processing and handling. Since normal tenderization does not occur in even prolonged periods in the frozen state, the minimum chilling developed in commercial practice resulted in inadequately tenderized birds.

The obvious remedy was to increase the chilling period, and this has been done in most plants. Chilling in slush ice has been increased to 24 hours or overnight in many turkey plants, and processors state that this has essentially solved their problem of consumer complaints.

Tenderizing

Controlled studies have shown that practically all of the tenderization that can be attained under a set of scalding and picking conditions occurs within the first 12 hours of chilling. Additional chilling may be justified to avoid a night shift or for slightly greater assurance of adequate tenderness in all birds. One large processor has gone back to chilling chickens in the New York dressed state, followed by cold evisceration, which he believes gives him a more tender product.

These remedies, while accomplishing greater tenderization, are otherwise backward steps in processing efficiency, and so they emphasize rather than eliminate the need for more information on the basic factors that influence tenderization.

Studies have shown that tenderization can be accomplished just as rapidly and as well by holding the thawed bird at chill temperatures before cooking as by holding the processed carcass at chill temperatures before freezing. The processor, however, does not wish to rely on the housewife. There can be many a slip between instructions on the package and housewife's practice. The bird should be tenderized when it leaves the plant. Adequate tenderization of turkeys marketed in a prestuffed form is especially important, since these birds will usually be cooked from the frozen state.

Other Factors Affect Tenderness

Processing factors other than holding time also affect tenderness. Adverse effects of excessive scalding at either 140 or 126 F also occur. Within the range of commercial scalding conditions, the effects of excessive scalding (higher temperatures or longer times) are not as pronounced as inadequate chilling or excessive beating during picking. However, an appreciable beneficial effect on tenderization can be expected and should be sought through use of the lowest temperature and shortest time that will permit efficient, easy removal of feathers by the picking machines.

Studies in both laboratory and commercial plants have now firmly established the fact that beating action of mechanical rubber finger packers has a toughening effect on the meat. The greatest difference can be observed between a machine-picked and a hand-picked bird — the latter is an ideal but commercially unattainable procedure for economic reasons. Machine-picked birds are roughly twice as tough as hand-picked birds.

Marked differences in tenderness can be developed among machine-picked birds by varying the severity and duration of the beating that birds receive from the rubber fingers. Tests in which birds were subjected to all or various machines in a commercial line of five mechanical pickers indicated that the toughening is cumulative and increases appreciably as birds are exposed to a successively greater number of picking machines.

Of particular importance is the finding that toughening induced by beating is not eliminated or reduced appreciably by prolonged chilling periods. An obvious recommendation based on these observations is to reduce the physical action of picking and washing machines and other processing operations to the minimum necessary to provide clean birds.

The factors of chilling, scalding and picking have been found most critical with the small fryer-roaster turkeys and are important for chicken fryers. Birds that are deep-fat fried are in general tougher than roasted birds, but processing factors exert their effect in both cases. In the case of large turkeys, requirements are not as strict; chilling times of about six hours appear to be adequate and no important effects of picking machines have been observed.

More Research Needed

Many aspects of poultry tenderization are still not understood. For example, we do not know why there is such extreme variation among birds processed under the same conditions; an occasional bird will be completely tenderized within two to three hours of holding, while some are tough after 12 to 18 hours. Similar animal-to-animal variations occur in beef. More information is needed on the practical effects of processing variables and means of controlling them and on the fundamental chemical mechanisms in muscle that cause or permit tenderization to occur.

Available data support two recommendations: (1) Chill birds for at least 12 hours. (2) whenever optimum tenderness is not achieved within normal aging periods, check scalding and picking conditions for possible improvements. — TRRF Bulletin.

California To Be New Home of Dole Pineapple Co.

BUSINESS reports and publications recently published an announcement that Dole Hawaiian Pineapple Company will move its corporate headquarters from Honolulu to San Jose, California, piecemeal in the next few years. President Henry A. White made the announcement. He says the company plans to create a new California corporation with a new name, as the successor to the present firm. According to White a new corporation will embrace the Dole Hawaiian Pineapple Company and its subsidiaries, F. M. Ball & Company at Oakland, California and Paulus Bros. Packing Co. at Salem, Oregon.

Inside-Out Wall in New Warehouse Planned for Future Expansion

THE MODERN warehouse opened last year by the Hartford Freezer Corporation is big—fifteen million pounds storage capacity—and before long the owners fully expect it to get lots bigger. That's why, when they planned the first modern cold storage facility built in southern New England for many years, they designed one insulated wall inside-out.

On the east side of the building, the 8-inch thick Armstrong Corkboard insulation is on the outer rather than on the inner side of the concrete-block wall. A coating of Armstrong Weatherproofing Plastic protects it from the elements. When the company builds additional cold storage space against this east wall, one side of the new freezer room will already be insulated.

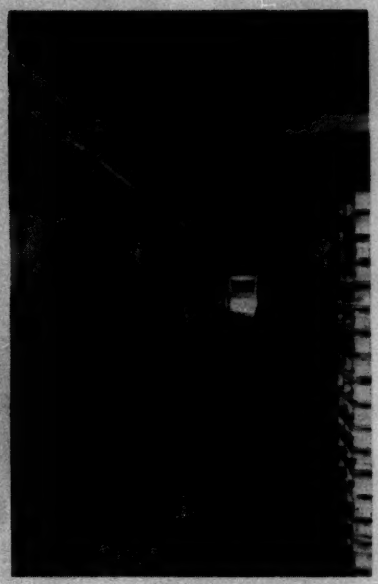
Meanwhile, the insulation is serving an important functional purpose. It helps hold a steady 32 F temperature in the wide corridor into which the present cold storage rooms open. This refrigerated corridor does double duty, serving as an anteroom to prevent excessive refrigeration loss when cold storage room doors are open; and also as an order assembly area.

Reprinted from Armstrong Insulator.

During construction, a hole was left in "inside-out" insulated wall for movement of materials into building. Workman above is sealing opening with Armstrong Corkboard. Weatherproof Plastic was then applied to provide protection from the elements.

At 32 F the temperature of frozen foods rises only one degree an hour. So, merchandise can be taken out of storage, assembled into orders for various customers, without becoming dangerously warmed, even if it has to be held in the assembly area for quite a length of time.

Radiant heating was installed in the concrete floor of this dual-purpose corridor to keep the concrete warm enough to prevent ice from forming. Other marks of well-thought-out construction include a controlled ventilation system under the subfloor to prevent frost from building up under the cold storage areas. Strategically placed thermocouples allow for periodic checks of ground temperatures.

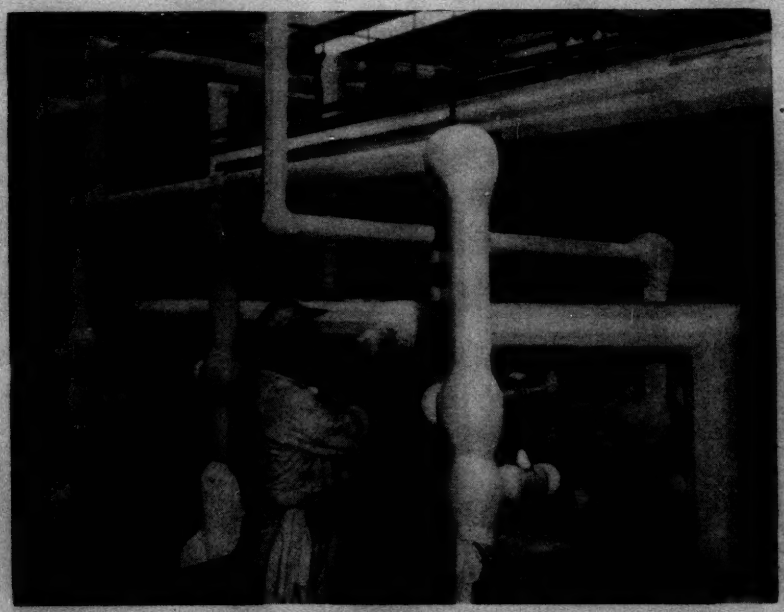


Interior view showing refrigerated portion of the building. Note fork truck ready to enter one of the cold rooms.

A rail spur and modern truck dock facilities provide for rapid transfer of incoming and outgoing perishables to ultimate distribution points. Inter-plant transport is handled by fork lift truck.

Freezer storage areas are insulated with 8 inches of Armstrong Corkboard and finished with a coating of Armstrong Monaplast. All refrigerant lines are insulated with Armstrong LT Cork Covering and Plasticork and finished with Insulcolor.

Refrigeration for the new plant is supplied by a 300-ton, two-stage ammonia system built by the York Corporation, York, Pennsylvania.



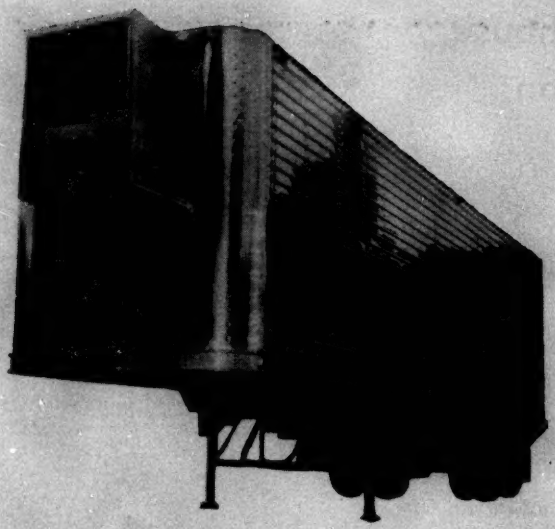
Refrigerant lines in compressor room were insulated with Armstrong LT Cork Covering, then finished with Armstrong Insulcolor. Plasticork, a moldable cork-and-rubber composition, was used to insulate fittings.

"Stop For Ice" Directory

FOR the fourth year The Canadian Association of Ice Industries has issued a directory of cash-and-carry ice stations in Canada. Distributed at motels, highway restaurants, travel bureaus, automobile clubs, chambers of commerce, tourist offices in resort areas, and ports of entry from the U.S. into Canada, these directories are of interest to many tourists and other travelers. They give the name and address of ice companies, located by cities, in which such service is available.

Refrigerated Vans For Frozen Foods

Harold D. Johnson



A refrigerated trailer of type used in Agricultural Marketing Service tests.

IN A FEW short years, frozen food has become big business—and it's getting bigger. From a 17-pound per capita domestic consumption in 1949, it advanced to 45 pounds per capita by 1955. Americans consumed some 7 billion pounds of frozen food last year. Frozen food transportation is big business, too. Truck-trailers and mechanically refrigerated cars represent an overall investment of some $350,000,000. When you add to this the investment in trucks and in ice bunker cars, this figure can be increased to almost $800,000,000.

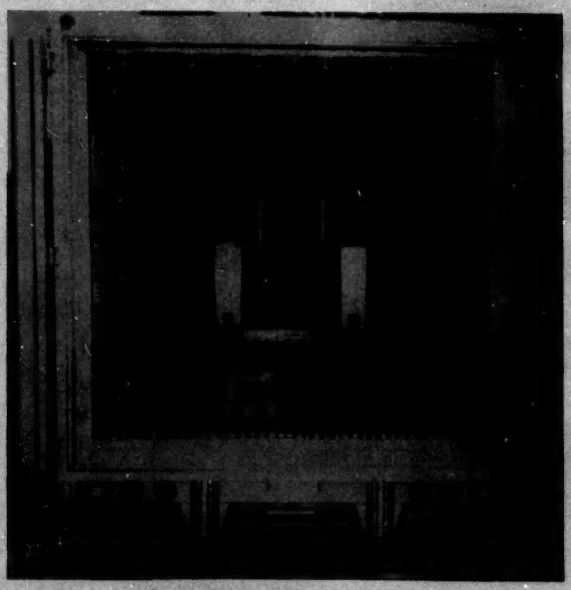
Whether the American housewife gets these products in top condition depends primarily upon the transportation facilities that bring them to the neighborhood market. The vehicles that transport frozen foods must have the ability to produce and maintain required temperatures throughout the trip. Not only must these temperatures be below a certain maximum (usually considered to be 0 F.), but fluctuations must be avoided. Varying temperatures can be detrimental to the appearance and nutritive quality of certain foods.

How cold air circulation affects temperature was the subject of a recent Agricultural Marketing Service research study. Specialists in the Transportation and Facilities Branch made tests in July, 1956, to determine how much space was necessary to provide adequate circulation around a load of frozen pies and precooked meals.

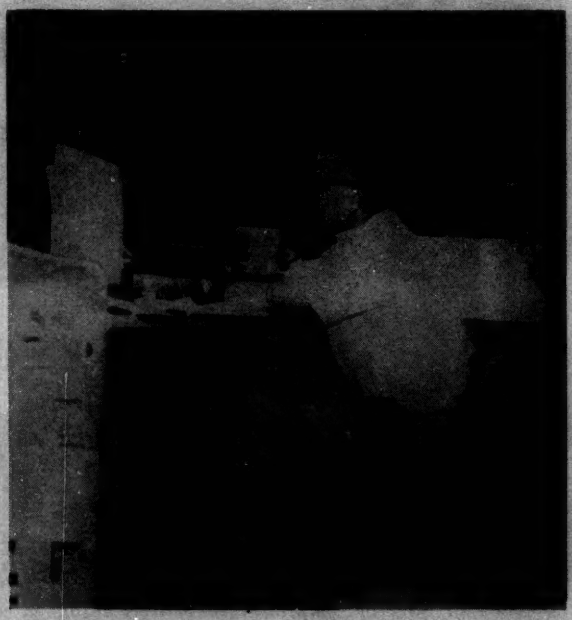
Researchers selected four modern 35-foot trailers, equipped with identical mechanical refrigeration units rated at 5-ton cooling capacity. Each trailer had strips on the interior nose. walls, and doors to facilitate air circulation. All four of the van bodies had similar construction and insulation features. The dinners and pies were loaded at minus 12 F with various combinations of space allowances assigned to each van. Some vans used floor racks; some did not.

The trailers moved together over a 1,200-mile trip with an average outside temperature of 71 F. Thermostats on the refrigeration units were set at 0 F. But none of the vans held that temperature—except in the top front position within the trailers,

Reprinted from Agricultural Marketing.



Before tests began, AMS researchers used a heater and fan to bring temperatures in all refrigerated van bodies to same level.



Inside panel truck, AMS researcher takes temperature readings.

a spot directly in line with the cooling units.

Researchers noted temperature variations between the tops and bottoms of all the vans, but a wider variation in those without floor racks. Comparative temperature statistics, however, revealed no definable relationship between available space for cold air circulation and commodity temperatures. It was, nevertheless, apparent that the van bodies and refrigerating units were not suitably matched to provide a satisfactory transport unit for moving cargo at the desired temperature.

To focus attention on the necessity for standard ratings for trailers and refrigerating units, Agricultural Marketing Service conducted a second survey at Edgewater Park, Miss., to determine performance differences in the various makes of vans. This test was conducted in cooperation with the National Bureau of Standards and the American Trucking Associations, Inc.

Seven new insulated and refrigerated semitrailers of 35-foot length were offered by their manufacturers for testing. Although not all the trailers met the same specifications, all were designed to give comparable service to the buyer. The test was conducted in an open lot with the trailers exposed to the weather.

Results of Test

Briefly, the test showed these differences:

Heat Transmission: 43 percent variation from 75 to 107 Btu/hr. (Degree F. difference between inside and outside temperatures).

Solar Heat Gain: 345 percent variation—from 230 to 1020 Btu/hr.

Warmup Time, 0 F. to 70 F: 55 percent variation, from 14.7 hrs. to 9.6 hrs.

Pulldown Time, 91 F to 0 F: 460 percent variation—from 2.7 hrs. to 15.1 hrs.

Refrigerating Unit Capacity: 150 percent variation—from 6,400 to 15,900 Btu/hr.

Assuming the refrigerating units used in the 7-trailer test were competitively rated, the need for adequate specifications is obvious and imperative. Logically, the first step in matching a refrigerating unit to a trailer requires a determination of the pertinent thermal characteristics of the trailer. Only at this point can applicable requirements for unit performance be set out.

Such a program for testing refrigerated trailers in the laboratory and on the road has been presented to industry organizations by U.S. Department of Agriculture and the Bureau of Standards. It involves the formulation of a standard method and the development of apparatus for determining heat gain and air infiltration of refrigerated trailers.

Prompt, coordinated industry and government action in studying the problem can result in better-matched trailers and refrigerating units, rated under standard conditions.

NARW-TRRF Executives Meet at Chicago

OFFICERS of the National Association of Refrigerated Warehouses and The Refrigeration Research Foundation met on June 17 and 18 at the Edgewater Beach Hotel in Chicago to discuss industry problems and developments. Among the topics covered were: Changes in distribution and the additional services now being offered by the public refrigerated warehousing industry; the relationship which the industry enjoys with its numerous customer industries.

Quick-Cool Your Product with the "King Zeero"

Provides Abundant Recirculated Ice Water at Low Cost

6 "KING ZEERO" units are now in use at the Hawthorn-Mellody Farms Dairy, Chicago, Illinois. (2 have since been added to the 4 shown above.)

- Thick ice is built up on the coils during the off-load period, using your own compressor. This assures an ample supply of refrigerated water for your peak cooling load at the time and place you need it.
- The ice water is pumped to your product cooler and returned for re-cooling. The water passes over the ice surface always, on its way through the "King Zeero" Ice Builder. Only in the "King Zeero" does this occur.
- The "King Zeero" will produce 32°-34° ice water for you without wasteful mechanical agitation. It will build and melt ice with remarkable economy and efficiency.

The sales representatives of the leading lines of dairy and refrigeration equipment who call on you will be glad to discuss details with you.

THE KING ZEERO COMPANY

Hospital Refrigeration Needs

Multi-Cooling Applications Are Witnessed By Practical Engineers In Tour of Henry Ford Institution

LEO C. GAGE
Refrigeration Inspector
Detroit, Mich.

Henry Ford Hospital Building, Detroit

HOSPITALS, to all of us, mean a place used for the shelter and treatment of the injured and the sick. The establishment of such institutions probably dates back as far as history has been able to record, and surely from the time of the Crusaders or the middle ages.

Alongside the government, the school and the church, hospitals have assumed a place in community life. They are no longer mysterious pest houses where people went to die. Rather, in this age of medical consciousness, most people realize their importance to total health and have provided themselves with knowledge about available facilities and economic protection against high cost in the form of hospitalization insurance.

Fig. 1—Left to right: George D. Delaney, Director of Personnel, Henry Ford Hospital, Leonard V. Bedard, Chief Engineer, and Chapter President; L. L. Adams, Chapter Secretary, Wm. G. Euth, Chapter Membership Chairman, preside at tour-meeting of Ford Hospital.

Refrigeration Essential To Modern Hospitals

With this growth has come an increased usage of modern engineering methods. Air conditioning and refrigeration play an important role both in the clinical treatment of patients and in medical research. Hospital buildings and equipment constitute one of our major national industries and are complex organizations from an engineering standpoint.

For this reason the members of the Geo. B. Bright (Detroit) Chapter, NAPRE, recently chose the Henry Ford Hospital for a tour. Purpose of the visit was to observe the installation and operation of its refrigeration and air conditioning equipment, as an example of what was occurring in other medical centers.

Leonard V. Bedard, chief engineer of the Henry Ford Hospital (who is also president of the Detroit Chapter), acted as host. The members met in the clinic building auditorium where they were briefed by Bedard (see Fig. 1) on the items of interest that would be inspected or observed in operation during the tour.

The Henry Ford Hospital is composed of essentially three separate units. One is a two year old clinic building which houses offices, examining rooms, and technical facilities for a staff of over 400 physicians and surgeons. (This is the structure which towers over the others in the photo above.) Another is the hospital itself which is over 30 years old (structure in foreground), and a research building (not shown) which is 45 years old. This combination of old and new adds variety and interest and problems to the responsibilities of the engineer.

The Tour

Mechanical equipment of the hospital and clinic building was observed in operation by means of a conducted tour. Attendance was divided into three separate groups so that best observation would be obtained. The clinic building actually has 19 floors and a basement. The 18th and 19th floors house some utilities and elevator machinery, and the basement is also used for utilities. The auditorium in this building, where the preliminary meeting was held, was designed with special attention to the acoustics so that speaking on the stage could be done without use of microphones, although microphones are provided for special occasions.

Alarm Console

First stop was at the engineer's office where the special trouble consol (Fig. 2) is located, and its func-

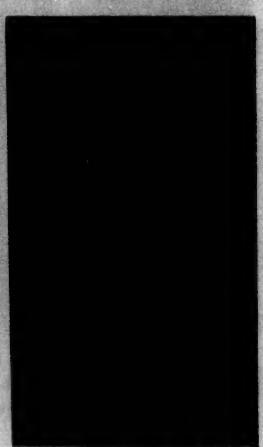


Fig. 2 (above)—Leonard V. Bedard, chief engineer, seated at supervisory alarm console in engineer's office. Fig. 3 (right)—Close-up of one indicator panel showing reset buttons for audible alarm, bulb test, and visual reset.

Recently, the Geo. G. Bright Chapter, NAPRE (formerly Michigan Chapter No. 1), held a meeting, followed by a tour at the Henry Ford Hospital, Detroit. This report of the inspection trip won the NAPRE "Report-of-the-Month" for March.

Fig. 4 (above)—Fan units on 17th floor provide conditioned ventilation from 17th through 11th floors.

Fig. 5 (right)—An operating room at Ford Hospital. Special conditioning equipment is required, separate from the central ventilating system.

tion was thoroughly discussed. The consol gives supervision of up to 90 points of possible trouble with service or equipment. The consol gives both audible and visual alarm when conditions other than normal develop. The audible signal can be shut off, but the visual alarm remains lighted until the conditions have been returned to normal.

In order to make the electric consol as foolproof as possible, it was decided to have all of the alarm circuits wired to relays in closed circuits which are normally energized. This meant that failure of wire or contacts at any unit would cause the alarm to operate. It involved maintaining all closed circuits together with a separate power source for the actual lighting and sounding of the alarm. A pilot light is provided on the panel to show that power is available for the alarm circuits.

The normally energized alarm circuits are also connected to the diesel engine emergency generator, so that even during the failure of public utility power, the panel would still have electric supply and be operative. The panel is provided with test switches which can be used to check the lighting for burnt out bulbs (see Fig. 3). This also provides a test of the audible alarm at the same time.

Automatic Ice-Making

A Vogt tube ice machine was observed in operation. This machine provides ice cubes for hospital requirements, cafeteria services and other special uses such as lowering body temperature of a patient before or during a special operation. It has a capacity of producing five tons of ice cubes in a 24 hour period. The tube ice machine is completely automatic and when started will continue to make and harvest ice cubes and deliver them by conveyor to the storage bin.

Harvesting of the ice is accomplished by the usual reverse cycle as used on some defrosting systems. The refrigerant flow is controlled by solenoid valves which are in turn operated by a timer. The freezing cycle can be varied so that ice can be made in small chips (short cycle), or nearly solid cubes 1½ inches in diameter by 1 to 1½ inches long (full cycle). At different seasons of the year when the water supply temperature changes, the timer is changed to adjust the freezing cycle to the change of conditions.

Utilities, Top Floors

The top (19th) floor of the clinic building houses two 15,000 gallon water tanks, one of which supplies water on a gravity feed to the clinic building and the other provides water for fire protection to fire stand-

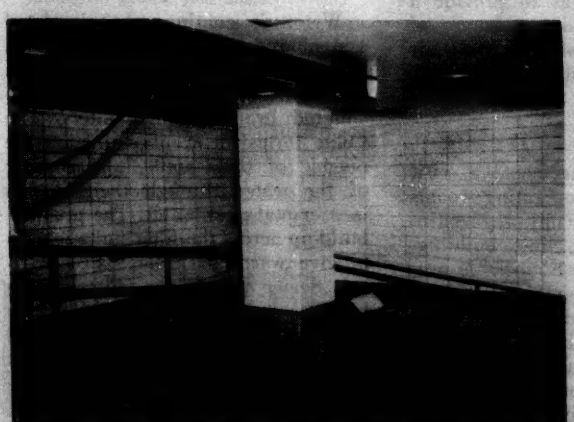


Fig. 6—Physical Therapy Pool Room. Ambulatory patients use the ramp descending behind the column. Temperature control of water regulates atmosphere.

Fig. 7—Another view of therapy pool. Disabled patients are handled in and out of conditioned water by means of special lift.

Fig. 8—City water is handled by these centrifugal pumps which transfer it from basement surge tank to 18th and 19th floor vessels for gravity feed to buildings.

Fig. 9—Caterpillar Diesel-Engine Generator, 300 KW cap., used to provide emergency power and lights at the Ford Hospital plant.

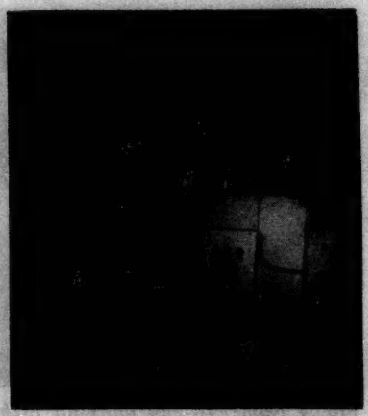


Fig. 10—Steam Generator by Combustion Engineering-Superheater, Inc., which supplies high pressure steam for laundry and sterilizers.

pipes and sprinkler systems for the entire premises. A hydro-pneumatic system is also operated on this floor to increase the pressure of water used on the 17th floor in order that the fixtures on that floor may be operated properly, inasmuch as the normal gravity pressure from the water tank to the 17th floor does not provide a high enough pressure for fixture operation. The elevator machinery and control room is also on the 19th floor.

On the 18th floor there are two more 15,000 gallon water tanks which provide water service for the entire premises exclusive of the clinic building. Two water towers on this floor provide condensing water for the two 850 ton Carrier centrifugal refrigeration units which are located in the basement of the building.

A large part of the ventilating system equipment is located at the north end of the 17th floor. The peculiar conditions encountered in the Detroit area where the extremes of weather go from below 0 F in the winter to at times over 100 F in the summer, require that equipment be designed to provide for both of these extremes; and, because of the industrial contamination as well as other air pollution found in any large city, provision must be made for thoroughly cleaning the air used for heating and ventilating.

The 17th floor ventilating equipment (see Fig. 4) provides conditioned air for the floors from the 17th down to the 11th. Two of the six fan units located there provide air at somewhat higher than normal pressure for the Carrier Weathermaster system (about six inches water column). This air is used to supply the Weathermaster units on the floors. The units are located on the outside walls at the windows. This high pressure air is used to induce circulation of the air in the room spaces so that the air can be cooled or heated by passing it over finned coils which are fed with either hot or cold water depending on the season. There are 720 of these Weathermaster units.

The touring engineer group proceeded to the 16th floor where one of the patient examining rooms was visited and the casing from one of the Weathermaster units was removed. The complete operation of the unit was explained, showing how the coils were located and how thermostatic control was accomplished. Also, some explanation was made of the method by which the thermostats themselves were changed from direct-acting thermostats to indirect-acting by a change of operating air pressure (from 15 lbs. to 20 lbs.), thereby utilizing a single thermostat to control a heating or cooling cycle. The high pressure air used to accomplish circulation of the room air is balanced so as to provide a continuous fresh air make-up of about 25 percent of the fresh air needed by the building.

Operating Rooms

By special arrangement, a visit was made to the operating rooms (Fig. 5) which occupy the entire fourth floor of the clinic building. Special ventilating equipment is provided to supply fresh air, and control temperature and humidity. Air conditioning for this floor is provided by four fan units, each supplying a separate zone. The desired percentage of relative humidity is maintained by temperature control of the water used on the spray units in the ventilating system. Outdoor air is cooled or heated and saturated with moisture, then reheated. This results in the air having the final temperature and the humidity recommended.

Physical Therapy Pool Room

Of particular interest to the visitors was the unique physical therapy pool room, used principally for treatment of polio and paralysis patients. The pool is designed so that patients may walk into it on an inclined walk (see Fig. 6), or stretcher patients may be lowered into the pool or lifted out of it by means of a special hoist (Fig. 7). The pool has three working levels, 3-ft., 4-ft. and 5-ft. The temperature of the water is kept at about normal body temperature, or a fraction higher, i.e. 98 to 99 F. The water temperature is maintained by the use of a low pressure steam heater. The control is located in the same room as the pool so that attendants can vary the water temperature if needed for special cases.

Water is continuously circulated and filtered while the pool is in use. The filtering unit is a type which uses Johns-Manville Celite applied to sintered bronze tubular filters. The Celite forms an even coating on the outside of these units, and forcing of the water through them results in a crystal-clear water. The pressure build-up across the filter units is used to give warning through an electrical device when the filter needs backwashing and recoating. Chlorine as found in laundry bleach is used to maintain the required residual for sanitary operation. This chlorine solution is fed into the pool water continuously.

Room temperature does not require special control for the air except to prevent drafts. The large

mass of water in the room at a relatively high temperature maintains the air temperature high enough for patient comfort.

Basement Utilities

The tour proceeded to the basement where most of the operational machinery is located. Observation was made of the automatic water softeners which are used to supply softened water for the laundry. Water is heated in storage type heaters which have 6,000 gallon storage capacity. There is one heater for the laundry, two to supply the main bed patient section of the hospital, and four for the clinic building; also another for the service building. The hot water tanks have a steel shell which is completely lined with sheet copper so that corrosion and rust will not occur. This also insures that the water will not be discolored with rust.

Pump Room

Five water circulating pumps are located in the pump room (see Fig. 8) — three of which are called "site" pumps, supplying the water used for all buildings except the clinic, which is supplied by the other two. To prevent excessive use or wear on any one of the three site pumps, the starting and control mechanism is provided with a sequencer change device which automatically changes the sequence of the pumps so that the same pump does not start each time there is a water demand. After No. 1 pump shuts down, No. 2 pump would start for the next demand. Likewise, when No. 2 pump shuts down, No. 3 pump would take the next load.

In the event of the demand being great enough to call for more than one pump to operate, the second pump will start and operate in conjunction with the first pump to supply the requirement. Or, in the event that the first and second pump cannot supply the requirement, then the third pump will cut in. The sequence takes place automatically. Likewise, the two pumps which supply the clinic building are automatically alternated on each start, and if demand requires, the second pump will automatically cut in.

These pumps take city water from a surge tank and pump it up to the tanks previously mentioned on the 18th and 19 floors. City water from "Water Works Pumping Station" comes in through a 12 inch line which is connected to a 36 inch city water main on the Boulevard. There is also another city water main from "Springwells Pumping Station" which is a 10 inch line located on another street . . . there is an 8 inch connection from this latter main. In this way water is provided from two separate pumping stations, insuring a constant supply in the event of emergency which might cut off one of the pumping stations.

Of particular interest in this machinery room were two Ingersoll-Rand special air compressors which have non-lubricated air cylinders. These compressors provide oil-free air for the operation of the many thermostatic valves and controls which are used in the buildings, thus assuring trouble-free operation of these controls which all have small orifices and would soon give trouble if the compressed air was contaminated. These air compressors have special carbon piston rings in place of the usual cast iron or steel piston rings. The rings are made in segments, and the piston is rotated manually periodically to maintain piston clearances.

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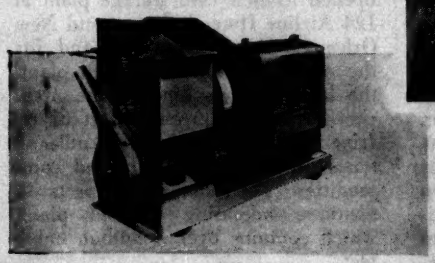

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Refrigeration Room

Two 850-ton Carrier centrifugal refrigeration units located in this room supply refrigeration for the air conditioning requirements of the clinic building. A third unit of the same size is now in process of installation. This unit will provide additional capacity needed to air condition the in-patient building. Three chilled water pumps are installed in this room to supply the chilled water for cooling in the Weathermaster units and for the coils in the ventilating fans. There are also three condenser water pumps which are used to pump water to the water towers on the 18th floor. The present two refrigerating units are driven by 900 hp wound-rotor motors, 4800-volt ac primary. This permits speed variation for load control. The banks of resistors are located in the same room. Start, stop and speed control for the tower fans is also located in the refrigeration room so that in starting and stopping the system it is not necessary to go to the 18th floor.

Although the third 850 ton refrigeration unit will be identical in total capacity to the present units, it will have a normal 4800-volt induction motor, without speed variation. It is felt that two units which can be operated at variable loads will provide ample control, and the third unit can be used at a constant load with one or the other of the two original units to take the load variation through speed control.

Vacuum Pumps

There is a rather extensive vacuum system used for the clinic building laboratories and the operating rooms. The vacuum is maintained normally between 15 and 20 inches, mercury column. This vacuum is produced by two Nash-Hytor automatically controlled vacuum pumps.

Electric Service

Electric service is provided to the hospital through two 4800-volt underground primary lines from two different Detroit Edison distribution sources, as a precaution against power failure. The primary voltage is broken down to 208-115 volts at five distribution points in the clinic building for distribution to sections of the clinic and other buildings. The average monthly consumption of electricity for both power and lighting requirements of the hospital is over 880,000 kilowatt hours.

A Caterpillar 12-cylinder 300 KW diesel-engine generator unit (Fig. 9) provides emergency electrical standby. In the event of utility power failure, the diesel engine will start automatically and take over the emergency circuits which will provide light and power so that all essential services can be continued. This unit is started with compressed air which is provided from three air storage bottles having 210 lbs. pressure. Normally the air supply will provide six starts of the engine without depleting the air supply. In the event that the Edison current may be off for a prolonged period which might require replenishing of the starting air, a manually started gasoline engine is provided for driving the air compressor used to maintain air pressure on these tanks.

Boiler Room

The greater portion of the steam required for the hospital is purchased from the Detroit Edison Company. The average monthly consumption of steam during the heating season is 13,500,000 lbs.

Steam supply to the premises is at a normal pressure of about 35 psig. This pressure is not high enough to provide proper operation of laundry mangles, presses, tumblers, and high pressure sterilizing — the laundry load being 12 tons per day. Therefore, two Combustion Engineering superheater boilers have been provided, each of which supplies up to 6,000 lbs. of steam per hour at 275 lbs. pressure. The steam pressure is reduced immediately to 100 lbs. for the laundry service, and to 60 lbs. for high pressure sterilizing.

These boilers (one of which is pictured in Fig. 10), are normally shut down at night and started up again each morning. They are so constructed that pressure can be raised to full 275 lbs. steaming pressure in a matter of five minutes from a cold start. The boilers are oil-fired with a light fuel oil and automatically controlled. They were designed to use light fuel oil instead of the customary heavy fuel oil usually used for steam generation, so that the same type of oil could be used for the diesel engine generator and thereby avoid the necessity for separate storage tanks.

In conformity with the policy of multiple sources of water supply and electric power, the normal steam supply for all low pressure requirements is brought to the premises through two 16-inch mains from two different sources of the Detroit Edison Company. Failure of one steam source would not interrupt service.

Other Refrigeration

When the hospital was orginally built, refrigeration was provided for the locations and spaces which required it by means of two Kroeschell CO_2 reciprocating steam-driven units. One unit was of 20 ton capacity and the other 60 ton capacity. This provided flexibility for load changes encountered in winter and summer. Double pipe brine coolers and CO_2 condensers were used.

The brine storage tank was large enough to provide enough reserve to permit shut-down in emergency for as much as eight hours without a serious temperature rise in the refrigerated spaces. Calcium chloride brine at a temperature of minus 10 F was circulated by centrifugal pumps capable of delivering up to 600 g.p.m. The temperature of the refrigerated spaces was controlled by coil size and hand adjustment of shutoff valves on the coils. Brine from this system was also used to supply an ice field for the making of ice.

Plans for the new addition of the clinic building in 1951 brought up the entire utilities problem for review, and it was decided to discontinue the generation of electric power and replace the brine system of refrigeration. The plans called for moving of all vital services to the new building. It was felt that the brine system should be replaced with individual direct expansion units at locations where needed. This was a major operation and the task was started and gradually accomplished. The changes were spread out over nearly a year's time, with the result that they were made with a minimum of interruption to the services. The change-over involved a total of 77 food storage refrigerators and, in addition, the blood bank, pharmacy, morgue, several research department units and a minus 40 F room for special chemicals and biologicals used in the laboratories.

New Warehouse Opens

THE NEW Orleans Cold Storage and Warehouse Corporation, Ltd., opened its new cold storage plant at 124 Airline Hwy. Jefferson and New Orleans officials were on hand for the opening ceremonies. The plant, the largest of its kind in the area, contains 1,300,000 cubic feet of refrigerated space and will handle all types of perishable foods and commodities. The company expects to continue operating its old plant, which contains over a million cubic feet.

Practical Refrigerating Engineer

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Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

From the Vice-President's Desk

Chase Acts For Vacationing McKenna — Encourages Chapter Activity, Reports

NEW ORLEANS—Educational Director Leroy Etzel started a "School for NAPRE Presidents", as one principal object of his 1957 program. Little did he or the Vice-President think that one would get practical experience as President to round out that schooling. NAPRE's Prexy, Bert C. McKenna, by taking an extended vacation brought about just such an opportunity.

McKenna departed in June for nearly a month's tour of the Western States. His absence and lack of contact with National affairs, he felt, required the vice-president to be actively leading the Association.

Message to Members-at-Large

As Vice-president responsible for welfare of Members-at-Large, a number of us got acquainted by means of the typewriter or pen and paper. Many of us met at our last convention in Detroit. It would be my pleasure to meet more members this year at the convention in Chicago, November 18 to 22. It is firmly believed that personal contacts like these have been responsible for NAPRE's growth to 40 chapters.

There is no reason why the Association can't grow to 60 chapters by the time our Golden Anniversary rolls around (1959-1960).

Refrigerating engineers are in demand all over the country, and this is just the beginning. NAPRE chapters will be able to help the young men who are just starting in this field of work to be better engineers. If they attend the chapter meetings where the Guy R. King *Basic Refrigeration* Study Course is taught, they will benefit. They would also acquire the experience of older engineers when there is a refrigerating problem brought on the floor at a meeting. Floor discussion will solve most problems. If a problem cannot be solved on the floor it can be referred to the Question Box.

Chapter Message

Charters will be announced and/or presented to five more new chapters: Bakersfield, Spokane, New York, Southwest Pennsylvania and Jackson, Miss. By convention time this year there may even be a few more chapters. Both established and new chapters' presidents and officers are urged to keep up the good work accomplished this year.

Invite management to your chapter meetings to let them see how your meetings are conducted. Those attending will go out and spread the word among themselves that NAPRE is strictly an educational group. A number of firms in New Orleans, as do other firms over the country, assist their engineers with convention expenses, and in this way encourage them to take an active part in NAPRE.

NAPE Diamond Jubilee

The National Association of Power Engineers, and educational group after which it might be said that NAPRE was patterned, recently celebrated its 75th anniversary. President McKenna extended NAPRE's congratulations and best wishes, to which he received the following:

"Your thoughtful letter of June 14th, addressed to our then National President, Walter Lamb, was read to the Delegates assembled at our Diamond Jubilee Convention, June 23-28, at Grand Rapids, Michigan. By unanimous vote of the Delegates, I have been instructed to thank you for your well wishes, and to extend to your membership the sincere hope that our two Associations can continue to serve the operating engineers — with mutual understanding — as we have so successfully in the past. Our Past National President, Walter Lamb; our National President, J. D. Holmes; and our National Vice President Ivan Cronkhite; extend their personal congratulations to your organization for the good work being done in your particular field — and their confidence, that with the ever-increasing use of refrigeration in the air conditioning field, your Association will grow as never before. Yours sincerely, Edw. J. Schuetz, National Secretary."

Award of Month, Los Angeles

Los Angeles and Detroit seem to trade off bi-monthly honors for the best reports. There's room for more. It isn't length, topic, nor number of reports that will win the bond this Fall; its quality, usefulness and information. Seattle, for example, nearly toppled Los Angeles out of top position this month.

Frank L. Chase

Codes And Local Ordinances

ANY discussion of codes and ordinances, or subjects of that type, should be preceeded by study or review which will endeavor to establish the reason for them, when they came into existence, and why any specific unit of society has to adhere to them.

To narrow that review down to the refrigeration field, it will be found that the installation of refrigerating equipment in the early part of this century—around 1900—was limited mainly to packing houses, breweries and places of that type, because, essentially, the equipment itself was large and cumbersome. Therefore, there were relatively few people that were exposed to any of the circumstances that surrounded its use.

However, around the World War I era, there was a decided increase in the amount of refrigeration application in other phases of industry and commerce, such that more and more people began to be exposed to the possible hazards that might exist in the use of refrigerating equipment. As this condition developed, there was an established need developed along with it for some type of regulation, some type of control that would make this equipment safe to be around and safe to operate.

Public Safety Basis For All Codes

Notice that the motivating element was the safety of the public and the protection of property involved. From conditions that had developed then, developed later on, and up to the present time, it will be noticed that this same basic factor keeps coming out all the time—the fact that *safety regulations are aimed squarely at protection of life and property.*

Code History at Detroit

About 1914 or 1915, Detroit City Fathers began to take cognizance of refrigeration equipment installations and the inherent hazards that surrounded its use; and, to cut a long story short, in 1916 they came up with an ordinance. This ordinance was aimed at controlling installation and operation of the refrigeration equipment. The thought was the establishment of minimum requirements to which this machinery and systems must be built; to which the installation must conform; and to establish maximum safety to the operators of the equipment, the people that came in contact with the equipment, and the property that was involved.

As time went on after the initial ordinance was passed, developments started to take place a little more rapidly. There was the development of the household refrigerator, and the multiple system. The multiple system in particular was obviously a type of equipment and an application that needed some regulation. There had to be some minimum requirements that applied. The 1916 law did not cover it, because it wasn't envisioned at the time.

Consequently in 1929 some amendments were passed which brought the 1916 law up to date and took into account the multiple system, its application and use, and the hazards that were involved. Then for a period of some ten years there were rapid developments in the refrigeration industry, but they were not of such character that threw the then existing regulations out of gear too much. By more or less flexible application of the law it still covered the requirements, still provided a maximum of safety with a minimum of trouble as far as installers and the operators were concerned.

However, by the end of that period—in other words, 1939—things began to happen as far as the application of refrigerating apparatus was concerned. It was applied here and there and everywhere to do all kinds of things, not the least of which was air conditioning. It is true there had been some air conditioning before, but it really began to catch on in the late 30's. And, along with this growth and development of the refrigeration industry was a growing need for some type of standard code that could be adhered to on a national basis.

Standard Code Appears

It was in 1939 that the American Society of Refrigerating Engineers "Standard", which is the American Standards Association code, was first given some roots round the country. Now, there was an ASA-B9 Code in existence prior to 1939, but it was ignored or unknown generally. Probably the reason that that code received no more recognition than it did prior to 1939, was the fact that it had not taken into account enough of the viewpoints that were necessary to bring about a workable standard. The other thing that was wrong was that it had not been put into a form which could be readily applied on a nation-wide basis.

However, the 1939 ASA-B9 Code corrected a lot of these troubles (and it got to the root of a lot of others but didn't do too much about them). It was good enough to be used in the City of Detroit, without legal status, from around 1940 until 1945; and it was in 1945 that the refrigerating industries hit their limit as far as Detroit was concerned. They could go no further with operating under an outdated Code, the 1916 Code with the 1929 amendment and use of a 1939 "Standard" without legal status.

Detroit attempted to write a new Code around the basic elements of ASA-B9 that could be used. Certain deviations were necessary, certain additions were necessary; but a new Code was drafted and it was adopted in 1945. The code remedied a lot of the difficulties that had been in existence prior to 1939, which had been dealt with satisfactorily simply because there weren't a multitude of them occurring. It turned out that writing this Detroit Code in the pattern of the ASA-B9 was rather a good idea, because the so-called National Standard was neglected for a period of time after that.

A code, regardless of whether it is National or an ordinance that is local in scope, must be tuned to the conditions which it governs. If it fails to tune to those conditions then it is useless. And, if it is not set up so that it can be revised from time to time, then it becomes just as useless as the Detroit Code that became outdated back in 1929. Therefore, the City of Detroit provided for revision of its ordinance to bring it up to date. The ASA-B9 could not be revised unless the people who had promulgated it and who were responsible for it saw fit to revise it, and they didn't at that time. Also, prior to 1948, Detroit had had no "adoption by reference" procedures which could be followed in the Department of Buildings and Safety Engineering. That was another reason why Detroit had to write pertinent sections of B9 into its own new ordinance.

An address by John C. Rehard of J. C. Rehard Associates, Consulting Engineers, and former Chief Safety Engineer, City of Detroit, before George B. Bright Chapter, NAPRE, Detroit, Michigan, May 23, 1957.

Adoption By Reference Permitted By State Statute

However, in 1948, the State Legislature in Lansing passed some regulations which permitted the Building Code of the City of Detroit to adopt external codes, recognized standards, by reference. So, in 1948, when the Detroit refrigeration ordinance was revised it was made a part, Article 30, of the Building Code in order to take advantage of "adoptions by reference" procedures. But, along about 1950, there came some more regulations through Lansing that permitted the "adoption by reference" in most any of the codes that are used by Detroit's Department of Buildings and Safety Engineering. So, putting it in the Building Code was a good idea at that time, but after 1950 it didn't need to be in the Building Code any longer.

National Standards Revised

Simultaneously with that development came a new development in the field of national standards. The significance of a *National Standard*, a regulation that could be applied nationwide rather than only in one locality, developed at an increasingly rapid rate from 1940 on. It was finally recognized that the standard developed for the purpose was going to have to be kept up to date (its major failing) and ASA-B9 went to work again . . . the code (B9) was rewritten.

The code was completely rewritten, put into acceptable form, and it was then implemented with the services of an interpretations Sub-Committee. This sub-committee was empowered not only to make interpretations of the code when requested, but also to make suggestions as to how the code should be revised. Those suggestions could then, at the three year revision period, be considered by the Conference Committee that governs the ASA-B9 code.

After that procedure had been adopted by the ASA-B9 Conference Committee, the code was then "acceptable by reference" in the Detroit ordinance and there was a reasonable chance that both would remain up to date. That is exactly what happened, and in January of 1952 the ASA-B9 became part, by reference, of the Detroit Refrigeration Ordinance (see Figs. 1 and 2).

Detroit has been a pioneer in this standards development field for a long time. Work on the B-9 Code was not the first. Detroit has worked on Boiler Codes; its representatives have worked on just about everything under the sun that involves safety and that concerns the protection of the public welfare and property. Adopting the ASA-B9 by reference was just one more step in trying to encourage others — towns besides Detroit, smaller and larger— to accept national standards, rather than to strike off on their own and, thinking that they had all the answers, try to develop standards for their community at the expense of the manufacturers and others shipping equipment to them. Obviously, the more equipment that was developed, built and distributed over the country, the more the manufacturer, the installer and the user needed a Code which could be applied every place, instead of having a different set of rules in every hamlet.

Overlapping Codes and Complications

To attempt to put everything that is needed to control installation and operation into any ordinance—for one field—borders on the impossible, because there are too many overlapping points in the matter. For instance, ASA-B9 makes no attempt to cover such things as machinery guards, ventilation in engine rooms,

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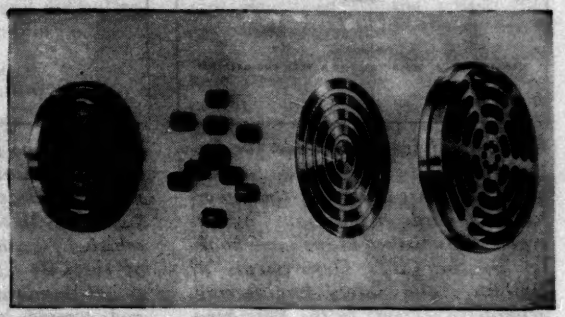

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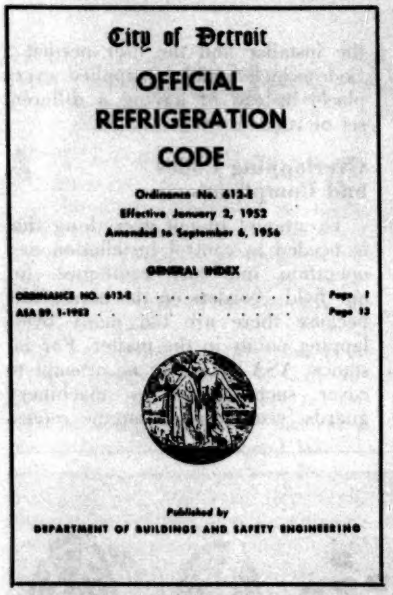

City of Detroit

OFFICIAL REFRIGERATION CODE

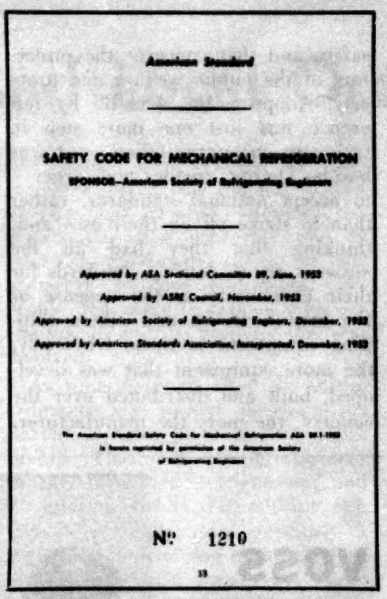
Ordinance No. 612-E
Effective January 2, 1952
Amended to September 6, 1956

GENERAL INDEX

ORDINANCE NO. 612-E . . . . . Page 1
ASA B9.1-1952 . . . . . Page 13

Published by
DEPARTMENT OF BUILDINGS AND SAFETY ENGINEERING

Fig. 1—Refrigeration Code for Detroit adopts the Safety Code for Mechanical Refrigeration of the American Standards Association, "by reference". Published in the same booklet by the City's Departments of Buildings and Safety Engineering, acknowledgements to the Refrigeration Code Study Committee include the author, then with the Detroit Bureau of Safety Engineering; and also the names of C. J. Purdie, Jr., who represented the Detroit Chapter, NAPRE, and past president of the chapter, Charles Heemstra, who represented the Refrigeration Contractor's Association of Detroit.


American Standard

SAFETY CODE FOR MECHANICAL REFRIGERATION

SPONSOR—American Society of Refrigerating Engineers

Approved by ASA Sectional Committee B9, June, 1952
Approved by ASME Council, November, 1952
Approved by American Society of Refrigerating Engineers, December, 1952
Approved by American Standards Association, Incorporated, December, 1952

This American Standard Safety Code for Mechanical Refrigeration ASA B9.1-1952 is herein reprinted by permission of the American Society of Refrigerating Engineers

No. 1210

13

Fig. 2—Page 13 of the Detroit Refrigeration Code reproduces the cover of the American Standard Safety Code for Mechanical Refrigeration, which by ordinance becomes a part of the City Code. The original national standards undertaken in 1939 and revised in 1950, included the late George B. Bright, for whom the NAPRE chapter is now named, on the committee. He represented ASRE. NAPRE's representative was Martin Vander Veer. Copies of the American Standard Safety Code for Mechanical Refrigeration are available from NAPRE headquarters at $1.00 per copy.

pressure piping, pressure vessels. Things of that type are referred to the proper standard that covers all the aspects of those subjects.

True enough, there are points in the code that are explanatory—they have to explain how this or that provision applies in the refrigeration industry. And, in some instances there are deviations because the other standard that is in existence doesn't quite cover the point. So there is an addition to the existing standard; but the point is that ASA-B9, Detroit Refrigeration Ordinance, or most any ordinance that is aimed at a particular field of endeavor cannot cover all the aspects of it. That is unfortunate in some respects, because it makes dealing with them more complicated.

However, consider for a minute: How is the legislative body or committee going to cover all of the various aspects? Are they going to write a new national electric code into the refrigeration code? Are they going to write Section VIII* of the ASME Code into the refrigeration code? It would be a terrific problem to try to put all of those things into one code and have it comprehensive and understandable. So there is really a good reason for this complication, or apparent complication, that seems to exist between B-9 and other codes.

Detroit's New Ordinances

Last year in the City of Detroit two new ordinances were passed that have a very direct and a very great amount of influence on refrigeration and air conditioning installations in the area. One of them was the new Building Code, and the other the Plumbing Code.

The new Building Code is patterned after the standard building code of the Building Officials Conference of America. This is one more step toward standardization or uniformity of requirements such as was developed in connection with the adoption of the ASA-B9 by reference in 1952. However, the Building Code is a little different type of document and it had to be written into an ordinance of our own. It follows closely the Building Officials Conference Code. A builder who is contracting elsewhere is not going to come to Detroit and find that he is up against an entirely different set of regulations, providing his other location, of course, is following B.O.C.A., too.

The articles in the Building Code that concern refrigerating engineers, are Articles 5, 7, 9, and 18. One of them governs ventilation. Those who install or operate air conditioning are very definitely influenced by the requirements in the Ventilation Section of the Building Code. Other portions of the Building Code deal with the weight that can be supported on certain types of structures. Obviously, if a contractor or engineer is going to put in refrigeration on or air conditioning equipment, or cooling towers, he will have to make sure that the structural elements on which he wants to set this equipment are capable of supporting it . . . whether it be a floor or a roof. So it is quite logical that the Building Code should have such regulations in it.

Water Conservation And Plumbing Codes

The other ordinance that was developed in Detroit last year (—it wasn't a new ordinance, in this case, it was simply amendments to the existing ordinance—) is the Detroit Plumbing Code. Refrigeration engineers and contractors frequently get disturbed at some of the things that the Plumbing Bureau makes an issue of, but, there is sound backing behind every one of them. When the "cooling tower epidemic" was assured by the passage of the requirements that there would be a surtax on water bills, it was obvious that something had to be done to keep in line with good safety practice and good health measures before the condition actually developed to the point where it was definitely hazardous.

Therefore, the Plumbing Ordinance includes provisions which require that certain basic rules be adhered to in the installation of cooling towers. In the first place, if a secondary water system of any kind is installed, the system must be color-coded in order to differentiate between it and the City water. In any kind of plumbing job, and secondary water is plumbing, a plumbing permit is required. The reason for that permit is that somebody has to go out and inspect the work, and some-

*American Society of Mechanical Engineers; Code for the Construction and Inspection of Unfired Pressure Vessels.

body has to pay that somebody else's pay. So the plumbing permit is an essential, basically because there is work involved and someone has to do that work and be paid for it.

As far as the Plumbing Code is concerned, there are some exemptions that have been written into it as the result of a rather concerted effort on the part of some industry members. In the first place, there is an exemption which states that 10 tons and under of refrigerating equipment may be installed without going to all of the trouble that is made necessary by those plumbing rules in some of the larger installations. There is also another exemption that permits the installations of fairly large equipment, provided that it is installed in a relatively small space; in other words, where the secondary piping is exposed and can be seen and is not so likely to get hooked up with something else. Actually, these exemptions can be granted only by the Board of Health . . . the Plumbing Bureau in this instance is acting as delegated by the Board of Health.

However, all should stop to consider that, in some of these air conditioning installations that exist and very likely even with new installations around the city, there is an excellent chance that the potable water system can be confused with the secondary water system unless some methods are employed that will clearly show that one is water fit to drink and the other water not fit to drink. One Midwest metropolis had a terrifically bad experience on two or three different occasions because of contamination of the water supply, both in a building and in a water district supply area. Fortunately, as far as the City of Detroit is concerned, some prime bad examples that the Board of Health will cite when cross-connections are discussed were usually limited in their effect and did not result in loss of life as in other cities.

Excessive Cost Eliminated

Nevertheless, in each case the potential was there. Fortunately, it was headed off before it got too far. These exemptions, the 10-ton exemption and the space limitation, are aimed at the elimination of the excessive cost of putting in double check valves at the meter when small equipment, or larger equipment in small space is used, they are quite reasonable.

As far as ordinances are concerned, they must be kept up to date. They must be dynamic in their nature. They must be moving all the time and the responsible body must recognize every significant change in the character of operations in the field where they apply. National standards must be the same way, and as day piles upon day the need for national standards is growing significantly . . . The more engineers can encourage the use of national standards in local ordinances, the better it will be for all concerned. Self-policing by the industry (national standards) applied locally by ordinance will prevent federal or national restrictive legislation. Use of standards developed by the people that are working conscientiously with such equipment will produce the best possible safety for the least possible cost and with minimum trouble.

As far as the coverage of the various codes is concerned, of course, engineers in the operating field are involved with the Operators Ordinance (Fig. 3). This again involves them with another regulation or Code. Like eggs, these regulations can't all be placed in one basket. Licensing of Refrigeration and Air Conditioning operators is therefore a 4th part

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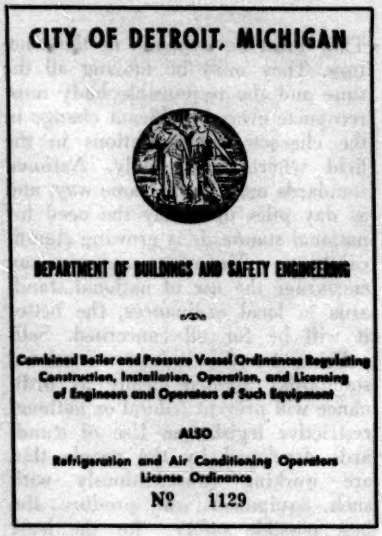
CITY OF DETROIT, MICHIGAN
DEPARTMENT OF BUILDINGS AND SAFETY ENGINEERING
Combined Boiler and Pressure Vessel Ordinances Regulating Construction, Installation, Operation, and Licensing of Engineers and Operators of Such Equipment
ALSO
Refrigeration and Air Conditioning Operators License Ordinance
No 1129

Fig. 3—Part 4 of the publication which includes Detroit Ordinances which regulate construction, installation, operation and licensing of engineers of operators of boiler and pressure vessels, covers in particular refrigeration and air conditioning items. The Ordance was effective in 1948. One peculiarity of the Detroit Ordinance is that it excludes systems employing only water as a refrigerant. This equipment does not need a licensed operator.

of another ordinance rather than a section of the Refrigeration Ordinance. Like the refrigeration, electrical, plumbing, and boiler codes and boiler operator ordinances, it was legislated in the interest of and for the preservation of the peace, health, safety and welfare of the people of Detroit.

Everything that is needed in any one field to make it safe is never found in any one code. The Refrigerating Industry is going to be involved with a number of codes no matter what it does. Responsible persons do not want it any other way. Practically, they wouldn't want to have to read through dozens of volumes of codes that cover pressure vessels, electrical wiring and one thing or another to find out what they had to do with a refrigerating system, hence the Refrigerating Code, the Operators License, etc., in their present form.

Duluth Warehouse Sold

COLD storage warehouse facilities at Duluth, Minn., operated under lease for the past six years by Chun King Sales, have been purchased from the State of Minnesota for $200,000.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Wants Booster Compressor Advantages Explained

QUESTION NO. 1185: Why are booster compressors used? Does the savings come from operating cost or initial cost? Why not use just one large compressor?—P.N.W., Seattle.

ANSWER: The term "booster" is used to describe a two- stage system in which the discharge from one compressor is delivered to the suction of another.

One reason booster compressors are so common is that the demands of the frozen food industry have forced cold storage and freezer operators to use lower refrigerant temperatures. This means not only an increase in overall capacity requirements but a decrease in the capacity of the machines on hand.

One way of solving the problem would be to replace the existing compressors with larger ones selected to operate at lower temperatures and to give greater capacity. Another way is to retain the existing compressors and add new ones to give the needed "boost" in capacity. The latter solution is usually more economical and hence has become common practice.

Another good reason for using booster compressors is the increase in operating efficiency that comes from a two-stage system. As the pressure ratio through which a compressor operates increases, the efficiency of the compressor tends to decrease due to leakage and frictional effects. Multi-staging helps to reduce these losses and increase the operating efficiency.—H. P. HAYES.

Heat Transfer In Tubes Improved By Some Scaling?

QUESTION NO. 1186: Does scale in a water cooled condenser seriously hurt heat transfer? It seems to me that scale decreases the flow area. This must make the water flow faster through the condenser, so you might actually get better heat transfer with scale than without. Can this be possible?—H.T.C., St. Louis.

ANSWER: Yes, scale on the inside of a tube does substantially decrease the rate of heat transfer; in three ways:

(1) It increases thickness of the wall through which the heat must flow;

(2) It acts as a layer of insulation; and

(3) It decreases the internal heat transfer area of the tube.

The theoretical possibility of an increase in heat transfer coefficient due to increased velocity is negligible in comparison to the above effects. Remember also that scale means increased pumping loads which is another objectional feature of scale.—H. P. HAYES.

Why Refrigerate Metals At Low Temperatures?

QUESTION NO. 1187: I have read occasionally of the effect that refrigeration has on metals. For example, I know that rivets for airplanes are sometimes stored in refrigerated rooms. Can you explain what effect low temperatures have on metals?—T.A.K., Norfolk, Va.

ANSWER: Study of the effect of temperature on metals is still in its infancy and not much is known about some phases of the subject. For example, ordinary steel gets very brittle at low temperatures while copper-zinc alloys do not. The addition of a slight amount of aluminum to steel helps it to resist low temperature embrittlement. A number of alloys have been tested for low temperature applicability, but cost and weldability become big problems.

Best references which can be suggested by this writer are Chapters 36 and 37, *ASRE Applications Data Book*, 1956-57; and INDUSTRIAL REFRIGERATION, August '51; Nov. '53; Aug. '54; Jan. Feb. June and Nov. '55; Apr., Nov., and Dec. '56; and, Feb. & Mar. '57. From time to time the National Bureau of Standards, U. S. Dept. Commerce, Washington 25, D. C., issues circulars listing reports on their work, which includes research in this field. Also, ASME and ASTM have some reprints of recent papers on this subject.—H. P. HAYES.

Do Isolation Pads Remedy Compressor Vibrations?

QUESTION NO. 1188: What is the principle behind the use of vibration isolation pads for compressors? What causes vibrations and how do pads cure it?—R.S., Tampa, Fla.

ANSWER: Problems in vibration are more easily understood by picturing them as equivalent to a spring with a weight hung on it. Pull down on the weight and then release it. The spring will pull the weight upward but it will overshoot the neutral position; the weight will extend the spring once more on downward travel, but again overshoot the neutral position, etc. Finally friction will damp out the motion and the spring and weight will come to rest in a neutral position.

From this example it will be noted that there are three important factors: the *initial force* (which could also be repeated at any intervals desired), the *spring effect*, and *damping* (friction in the example above).

In the case of a refrigeration compressor, the reciprocating motion means that a variable force is being applied to the compressor unit. The compressor unit has a certain spring effect, and damping comes from friction. The system has a certain

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natural frequency and vibration will be worse at some speeds than others.

The object of vibration isolation pads is to keep the compressor vibrations from being carried through to the building structure. Some pads such as rubber or cork also produce additional damping to absorb some of the vibration. In selecting the pads, it is important that they have a different natural frequency from the compressor. The greater the difference between the two frequencies, the less the chance of transmitting vibrations. On the other hand, if the frequency of the pad is the same as that of the compressor, a resonant condition will be produced and vibration will be excessive.

The effectiveness of vibration isolation is measured by transmissability. Low transmissability means good isolation. It can be roughly computed by the formula

$$T = \frac{1}{\left(\frac{f}{n}\right)^2 - 1}$$

where T = transmissability
f = frequency of machine vibration
n = natural frequency of base.

—H. P. HAYES.

Moth-Proof By Refrigeration

QUESTION NO. 1189: How effective is refrigeration in killing moths? I am thinking of fur storage and how low a temperature I need to be safe from moth damage.—H.G., Chicago.

ANSWER: A number of tests have been conducted to determine the effect of temperature on moth life. Test results were:

Temperature	Time to Kill all moth eggs
0 — 5 F	1 day
5 —10 F	2 days
10 —15 F	4 days
20 —30 F	21 days

A very effective technique is to expose the moth life to 20 F for three or four days, raise to 50 F for one or two days, lower to 20 F for two or three days, and raise to 35 or 40 F as the normal storage temperature. This treatment, particularly if repeated a few times early in the storage season will destory all forms of moth life.—H. P. HAYES.

What Are Methods For Temperature Measurement?

QUESTION NO. 1190: How many different ways are there to measure temperature? I have an idea which may be patentable and would like some way of finding out whether the idea is really new?—C.S., Los Angeles.

ANSWER: Basic point to remember about temperature is that it is a relative index of the hotness or coldness of something. Temperature does not exist by itself. Therefore, in measuring temperature, we look for something which changes with the addition or subtraction of heat.

For example, we know that the length of a column of mercury changes as the column is heated or cooled. Consequently, we use that property of changing with temperature as a measure of temperature.

In studying temperature measuring instruments, you might make a list of things which change with temperature. When you get the list done, you will find that most instruments in use one of the things you have listed. Here are a few examples:

Property that changes with temperature	Instrument
Color	Optical pyrometer
Heat radiation	Radiation pyrometer
Length of a Hg column	Mercury thermometer
Electrical resistance	Resistance thermometer
Vapor pressure	Vapor bulb thermometer
Melting point	Ceramic cones

Animal activity changes with temperature also, although I know of no commercial instruments based on this principle. For example, if you hear a cricket chirping, count the number of chirps in 14 seconds, add forty and you have the temperature in degrees F.

In summary, there are literally thousands of ways to measure temperature, but only a few have been exploited commercially.—H. P. HAYES.

New Questions

Can Rain Soaked Insulation Be Dried Satisfactory?

QUESTION NO. 1191: What experience have members had with fibrous type insulations which were rain soaked during construction? What can be done to dry it out? Are any ill effects to be expected?—M.S., Milwaukee

Does Buried Insulated Pipe Get Special External Cover?

QUESTION NO. 1192: What is the proper method of laying an insulated ammonia line underground for a distance of about 150 feet? Should it be laid in a cement lined trench? What is the best type of insulation, and is any special preparation of it involved that wouldn't be necessary if in the open air?—J.J.B., Member-at-Large

Enthalpy Definition Request

QUESTION NO. 1193: Can anyone give us an understandable definition of the term "Constant Enthalpy" as is found on the Mollier Chart?—C.S., Spokane, Wash.

Seeks Fouling Cause In Force-Feed Lubricator

QUESTION NO. 1194: In a McCord force feed lubricator with glycerine sight glasses on our ammonia compressors, I have trouble with the formation of a sticky substance in the sight glasses and oil lines. It ranges in consistency from jelly to hard gum, and in color from brown to black. It will plug oil lines shutting off lubricaion. I use 98 percent pure glycerine and have checked oil supplies for water content with no results. What is this substance and how may it be curtailed?—C.P., Bakersfield, Calif.

Harvest Cycle Upsets Auto-Ice-Maker Functions

QUESTION NO. 1195: I have an ice machine, package unit, one ton per 24 hours. In the cycling process it loses its gas and oil out of the compressor. When it drops its ice by the use of the hot gas, the gas does not return to the compressor and will also lose what gas is in the receiver and condenser which are all built in one unit. All solenoids have been tapped with a hammer to check for sticks but that doesn't help. After two or three pump downs the gas and oil will come back and work perfectly for a while. Then the trouble starts all over again. Can you give me any suggestions on how to cure this trouble?—C.W., Tulsa, Oklahoma.

Do High-Side Pressure Terms Mean Same Thing?

QUESTION NO. 1196: Is it correct to use the terms head pressure, discharge pressure and condensing pressure as all meaning the same thing?—J.B.S., Green Bay.

Sea Water Refrigeration For Preserving Fish

A RETIRED university professor from Washington State is trying to induce Canadian fisherman to install sea-water refrigeration units in their vessels. Herman Olsen, 53, tied up his 12-ton troller Winsome at Prince Rupert, British Columbia to give local fisherman a look at his refrigeration equipment. Since his retirement he has been working in cooperation with the Fisheries Research Board of Canada, putting into practice their advanced ideas.

Storage tanks are filled with sea water containing 3½ per cent salt which is kept at 30 F by an ordinary refrigeration unit operated from the engine-room. The new method saves cost and inconvenience of using ice to keep the fish. Crushing weight of ice and fish on earlier catches can mean loss of weight up to three per cent, and more important, loss of protein value.

It cuts down the time limit imposed by ice storage. The skipper can continue fishing as long as he likes with no fear of fish going bad. Cost of installation on an average troller is from $1,000 to $2,500 according to the number of refinements required.

How to Gain Stability in Stacking

THERE are a number of methods of stabilizing piles of palletized packages, according to Lee A. Waller, Wichita, Kansas, reporting to the National Association of Refrigerated Warehouses.

In their own case he says, they have found that for our multi-story plant with about 60 per cent of the space having been constructed at intervals over the last 45 years and 40 per cent last year, the 48 by 36 inch pallet is most suitable. This saved them having to change quite a lot of their doors which are only 42 inches wide. This size pallet permits them to stack eight 24/10-oz. boxes to the layer which in most cases are stacked 13 high. They are stacked three boxes side by side, two long and two boxes turned crosswise at the end. Every third layer they change the ends and increase the stability some.

To help stabilize these loads, they put a rack about two-thirds the way up on the pallet, but even this does not completely prevent the breaking down of boxes. They have also found that frozen food packers who have made their master container to fit tight against the top and bottom of the boxes inside have almost completely eliminated stacks falling over. A good example is in the large quantity of fordhook limas received. Some of the master containers are 11 by 16-5/8 by 5, other were 11 by 16-5/8 by 4-1/2. They had no trouble with the boxes that were 4-1/2 high.

The use of stacking irons is practiced by some refrigerated warehousemen. Some of these stacking irons are designed with special end pieces which make them self standing when fitted over the end deck board at the corners of a pallet.

Quality Controls For Frozen Poultry

WE KNOW frozen products are not always held at minus 10 or at 0 F. We know that due to accident, carelessness, or possibly in some cases lack of information, frozen poultry is subjected to 15 F, 20 F, or even thawing temperatures. This is, of course, undesirable from the standpoint of retaining quality. Our research in this field is being conducted to provide comprehensive and detailed answers to the question, "Just how do frozen foods behave under the conditions they meet in actual practice?"

Our studies so far reveal that: (1) Frozen uncooked poultry deteriorates approximately two to three times as fast at 10 F. as at 0 F. and four to six times as fast at 20 F. as at 0 F; turkey dinners deteriorate at least six times as fast at 20 F. as at 10 F; turkey pies deteriorate about three times as fast at 20 F. as at 10 F. . . (2) Fluctuating temperatures cause more deterioration than the mean temperature of the fluctuation as predicted from theory, but they do not appear to have a significant special or triggering effect except for moisture loss . . (3) Damage is cumulative, making teamwork along the distribution pipeline essential if the best quality products are to reach the consumer; order of exposure is unimportant, the same deterioration occurs whether samples are exposed to 20 F., then held at lower temperature, or held at the lower temperature, then exposed to 20 F. . . (4) More stability can be built into products through better packaging, use of anti-oxidants or other stabilizers; oxygen of the air seems to be a critical factor.

(Highlights of talk given by Dr. Hans Lineweaver, Western Utilization Research Branch, USDA, February 15, 1957, at the Institute of American Poultry Industries' 28th Fact Finding Conference, Kansas City, Missouri)

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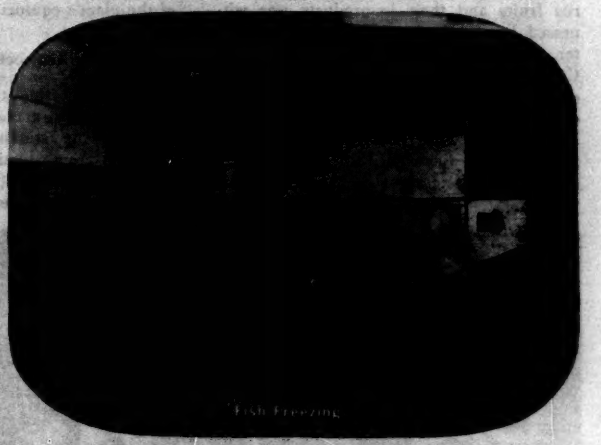

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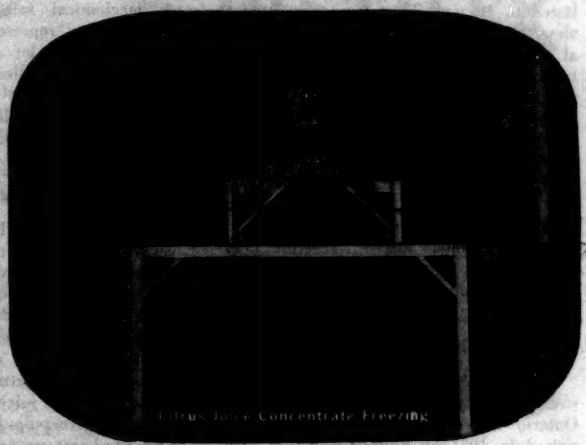

Write for Niagara Bulletin 105

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District Engineers in Principal Cities of U. S. and Canada

News Notes and Chapter Activities

Engineers Tour Orange Concentrate-Freezer Plant

ONTARIO, CALIF.—Processing of citrus fruits and their by-products was witnessed by members of Los Angeles Chapter, NAPRE, who journeyed to Ontario, Calif., on June 5 to inspect the processing, cooling, freezing and handling facilities of Exchange Orange Products Company, Inc., at 616 East Sunkist Avenue. The plant is a division of Sunkist Growers, Inc., and is the largest of its kind on the West Coast.

The group, headed by Secretary Donald H. Byl, was taken on a 2-hour tour that lasted to 10 p.m. They were permitted to view the operation starting with the arrival of the whole oranges in double trailer trucks, to final conversion into end product, which is concentrated orange juice, frozen and unfrozen.

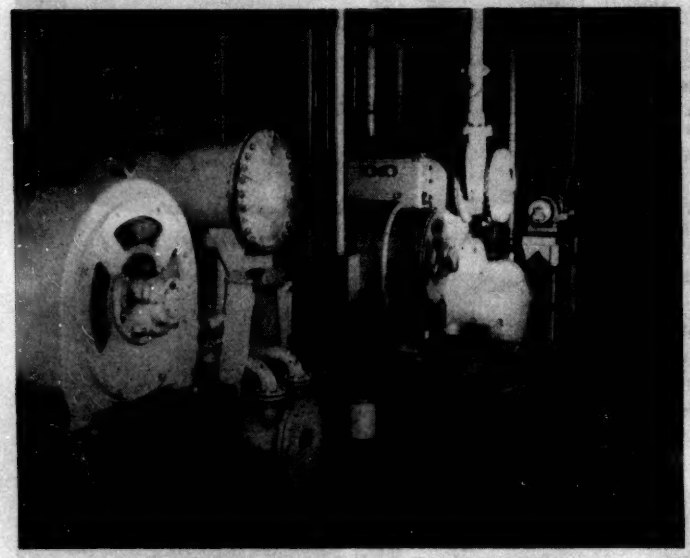
Host for the evening was Carl L. Hooker, utilities engineer for the company, and past-president of Colton Chapter, NAPRE. The visitors from Los Angeles were taken through in groups of ten, with Hooker and refrigeration operators John S. Shaw, W. I. Ward and C. Dees of his staff serving as guides.

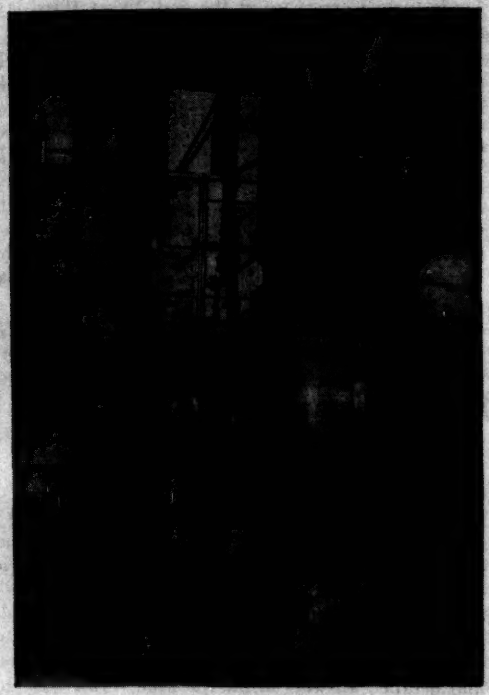
Established in 1920

Visiting engineers learned that the Exchange Orange Products Co. plant in Ontario was established in 1920 and acquired in 1931 by Sunkist Growers, then known as California Fruit Growers Exchange. The firm produces natural strength and concentrated frozen orange juices, orange oil, citrus molasses, orange pulp, pectin, pharmaceuticals and other products from oranges. Extensive refrigeration and cooling installations are part of the plant's equipment.

Laboratory Inspected

After inspecting the main quality control laboratory, actual plant tour began at the receiving station where oranges are unloaded from aluminum trailers. Fruit is emptied onto a 30-inch belt conveyor, which transports the oranges to an elevator that carries the fruit to sorting bins. A full load can be emptied in 25 minutes. A mechanical sampler in the elevator removes a representative batch from each incoming lot of oranges. The field product is thus allocated to the appropriate packing house on a basis of total solids (after sample analysis in one of the several laboratories spotted about the 10 acre plant).





Some of the refrigeration machinery used in the Ontario, Calif. plant of Exchange Orange Products Co., in the production of concentrated frozen orange juices and by-products manufactured from citrus pulp. Above, one 500- and one 350-hp Refrigerant 11 water chilling sets. At right, looking along engine room aisle where multi-cylinder reciprocating NH_3 compressors are located. A 460-volt distribution and motor starter panel, end of aisle.

Move from Sorting Bins

From the sorting bins, the fruit, on conveyor belts, moves through a preliminary washer and then over another inspection belt for removal of broken, moldy or otherwise defective fruit. It then goes into one of several 900-ton storage bins. From the bins, the fruit can be routed to the division where natural strength, concentrate, or frozen juices are produced, or to a plant where pulp juice and compounded beverage bases are processed.

A third washing operation is handled in two high pressure citrus washing machines. The fruit first drops into soaking tanks in the washer which contain 0.25 percent silicate detergent solution. It remains in the solution for one minute, and then moves up an elevator to the upper part of the machine. There the fruit is subjected first to a hot water detergent spray at 180 psi and then to a cold water rinse.

Extraction Process Observed

Juice removal machinery in the extraction room was next inspected by the NAPRE visitors. A battery of 30 extractors is used in the Ontario plant. Twenty-two of the machines ream the juice from the fruit without crushing the peel, at the rate of 350 to 400 oranges per minute. The separated peel is later pressed in other machines for removal of oil, and then is either treated for pectin recovery or made into dry pulp cattle feed.

The orange juice then passes through another battery of machines in which seeds and heavy pulp are removed, and moves on to collecting tanks to permit entrained air to escape.

Deaeration follows under an absolute vacuum of 0.7 in. Hg during which it is flash cooled from 80 to 68 F. The deaerator in use in the Ontario, Calif., plant is in the form of a tank 34 inches in diameter and 45 inches high. Juice is sprayed over a stationary head to provide ample deaeration surface. Steam jets are used to maintain vacuum.

Juice Pasteurized in Plate Heat Exchanger

Pasteurization of the juice is the next step. This is accomplished in a plate heat exchanger at 195 to 200 F. The hot juice leaving the pasteruizer is cooled by incoming juice to 180 F, which is the temperature at which it is canned in 6-, 18- or 45-ounce cans. If the temperature of the juice moving toward the can fillers drops

below 180 F, it is automatically divereted to supply tanks. After filling, the cans of pasteruized orange juice are cooled by water sprays, dried, and moved to the labeling and packing department.

Concentrating Operations

In another operation, finely screened juice is first centrifuged in a 2800-gal-per hour clarifier, and then passed to 100-gal stainless steel holding tanks. The tanks are ammonia jacketed to chill the juice as quickly as possible. The tanks have the ammonia inlet at the bottom and the outlet near the top.

Next operation inspected by the Los Angeles NAPRE men was concentration of the product by low temperature evaporation. The Ontario plant employs three stainless steel evaporators:

(1) A three-stage, single-effect unit with downflow vertical tubes, using hot ammonia gas at 108 F and 225 psig to provide heat of evaporation. Evaporation of the juice occurs at 58 to 60 F, and absolute pressure of 0.4-in, Hg.

(2) A reverse-flow, multiple-effect evaporator which concentrates the juice progressively in 55, 65 and 75 F effects.

(3) A reverse-flow, double-effect unit operating at 50 to 65 F.

The evaporators have a rated capacity of 10,000 pounds of water each per hour. They operate on the Kelvin heat pump principle, and use a mechanical refrigeration cycle.

The single effect evaporator uses ammonia as refrigerant and operates with a reciprocating compressor powered by a 700 hp synchronous motor. The other two evaporators are Refrigerant-11 machines and function with centrifugal compressors driven by 500 and 350-hp induction motors, respectively.

Heat Exchange Media

Refrigerant-11 units employ water as heat conveying media between the refrigerant condenser and the first effect of the juice evaporators. A barometric condenser supplied with refrigerated water from the Refrigerant-11 chiller is used in the succeeding stages in the triple-effect unit. The other two concentrators are equipped with surface condensers for the secondary effects, and have the actual refrigerant inside the tube.

After concentration, juice moves through an ammonia refrigerated cooling system and into two 2,000-gallon ammonia jacketed tanks. The temperature is dropped from 60 to 40 F (sometimes lower) during storage.

The plant also contains three 500-gal ammonia jacketed tanks for storage of coarse pulp juice. These cold-wall tanks are equipped with rotary scraper blades to prevent ice from accumulating. The juice enters near the top-center to the tank and passes into a rotating radial trough attached to a central agitator. From the trough the juice discharges at the tank wall so that it flows down the wall in a thin film, with the ammonia jacketed wall of the tank.

Canning Machinery Viewed

Visiting refrigeration engineers were shown the canning department as the next step on the tour. Two 14-valve machines fill six-ounce cans at the rate of 250 to 300 per minute, each. After sealing, the cans move through an air tunnel, or alcohol immersion freezer.

The immersion bath is a round-shell freezer which contains isopropyl alcohol at minus 30 F. It is fully automatic and freezes 300 six-ounce cans per minute. The cans are then dried by a brush cleaner and conveyed to storage. Other cans on a wire belt move through a 12 x 62-foot air tunnel, where an air blast at minus 30 to minus 40 F is directed at the cans to reduce temperature to 10 F.

The frozen cans from the alcohol shell freezer and the air tunnel are then moved to a storage room where temperature is maintained at minus 10 F. A palletized system of storage is used. The warehouse can accommodate 60 carloads.

In cooling pulp juice at the Ontario plant, the juice is flash pasteurized at 200 F. in a hot-water jacketed version of a three section heat exchanger. It is then cooled to 120 F with cooling tower water, and to 70 F with refrigerated water. Final storage is at 35 F in one gallon cans.—Fred Herr

Tennessee "Packing" Clinic

MEMPHIS—"Packing is packing" to some people, but to Mid-South NAPRE members it is a scientifically manufactured accessory which should be installed with good engineering ability and judgment. George B. Bates, vice-president, Phoenix Rubber Company and Jessee Ehman, district manager, Raybestos-Manhattan Company, convinced the members of this fact at a packing clinic. The clinic was the leading feature of the June meeting.

Speaker Ehman used a color-sound motion picture to present various kinds and types of packing. This visual-sound aid explained how the packings were made, what type of packing should be used in various machinery and applications. Following the motion picture presentation, Ehman went into a detailed discussion on the use of packing in refrigerating plants. Both Bates and Ehman discussed the abuse of packing that they have encountered in their many years of experience. By means of samples they demonstrated the proper type and application.

Owner of the Phoenix Rubber Company, Mrs. Sue Davis, one of the few lady associate members in NAPRE, proved to be the most outstanding hostess in the City of Memphis. Preceding the packing clinic meeting, she was responsible for a cocktail hour which was followed by a fine buffet dinner. All members who had sent in reservations for this meeting were amazed when Mrs. Davis presented them a personalized gift in the form of a box of book matches. Each match book cover was imprinted with the individual's name and the box itself was in the form of the rubber company's delivery truck. A rubber firtige mat was given each person in attendance. The firm displayed the various

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rubber goods line which they handle. It included hose, belts, gloves clothes, boots and shoes, in addition to the packing line. Member W. A. Taylor was the lucky recipient of a fine wallet containing a twenty dollar bill. This award was made to one only of the members and guests who register at the exhibit.—CHAS. CONLEY.

Qualified Engineers Help Reduce Insurance Costs

SEATTLE—When evaluating insurance for a building and its operating plant, one of the most important items taken into consideration is whether or not the insured has a qualified and properly trained operator. Further, of almost equal importance is whether or not the plant has a regular preventive maintenance program. These two facts were emphasized by Warren Murray, boiler and machinery inspector, General Insurance Company, speaker at the May meeting of Washington Chapter No. 1, NAPRE, Seattle.

According to the speaker, it is not enough that the plant chief and his operating engineers be good mechanics. The chief, especially, should have a thorough knowledge of his plant and all operators should have sufficient knowledge to take suitable steps in an emergency. The plant engineer should know the condition of his plant and put into operation a preventive maintenance program if the plant does not have one which is being practiced.

Survey Factors Given

Among those items an inspector looks for when making a survey, is the condition of the building; whether or not it is in good repair or obviously run down. Structural defects are taken into consideration. Insulation, piping, and condition of the operating machinery are all surveyed closely, according to the speaker.

Spare parts are even considered in surveying a plant for coverage and the premium certainly advances with a failure to have an adequate spare parts inventory. Spare horsepower is also considered. Does the plant have a little reserve capacity or is it running to full output? Piping supports are another item considered. The operating season and the machinery running hours also bear weight on the considerations.

Special Feature By Sporlan

The chapter was favored in May by an added or extra educational feature. John A. Hogan, sales engineer, Sporlan Valve Company, came up to Seattle from Redwood City, California, to present an interesting, informative and illustrated talk on control valves. In addition to reviewing the history of various controls, speaker Hogan detailed the various types and explained full their applications. Members were gratified by the manner in which the speaker handled his presentation and many of the members expressed their surprise and appreciation to the fact that the talk and the illustrations contained no commercialism. The fact that the presentation was of timely interest is substantiated by the fact that the presentation ran well over a half hour beyond the scheduled time, during which period Mr. Hogan was answering questions from the floor.

At the refrigeration classes during May meetings instructor Bob Harrison continued his discussion of the chapter on operating from Guy R. King's text "Basic Refrigeration". The discussion on operating had gotten under way at the April meeting. At the April meeting James Alfred Cooper, maintenance engineer of the Doctors Hospital was admitted as a member of the chapter.—JOHN GRAINGER.

Boosters Get Attention At San Bernardino

COLTON — California Chapter No. 5 tackled the subject of booster compressors at their April meeting held in the Santa Fe ice plant lunchroom. This topic seems to be a popular one on the West Coast this season of the year as it was noted from the reports exchanged between the chapters that units from Southern California to as far north as Spokane, Wash., were all presenting speakers on the topic.

Instructor Frank J. Scherer explained why booster compressors were used. He showed how energy costs increased sharply as compression ratios went up. By dividing the work load between two compressors, one handling relatively low pressure high volumes of gas and completing the compression with smaller volumes, less energy would be consumed. From there the discussion drifted into various booster compressor operating problems. The questions that came from the floor and the answers which came from both the chairman and other members on the floor eliminated any necessity for the regular Question Box.

Vice-President, J. E. Finfrock, presided in the absence of J. E. Machut and J. H. Mairs acted as secretary in the absence of Harry Bonter, both of whom were excused on account of illness. Colton meeting closed with the usual "something for the inner man".

Charter President Dies

Colton Chapter lost its charter president on May 2 at the age of 78. Charles S. Bull had been ill for several years. Surviving are his widow and son. Mr. Bull had been very active in refrigeration for many years, having been with Armour Packing Co., Chicago, before coming to Colton 39 years ago, where he was plant manager for Pacific Fruit Express Co. ice plant until he retired in 1942. He was active in the City of Colton as Councilman and other civic activities, and also held office of Director in the Orange Belt Building and Loan of Colton. He was one of the 30 charter members whose names appear on the Colton California No. 5 Chapter charter.

Sporlan Heads Program

Two representatives from the Sporlan Valve Company were guests of the chapter at the May meeting. P. J. McCarty of the subject firm took the first half of the lecture session, presenting a color slide film and commenting on the installation and operation of thermo-control valves and filter driers for halocarbons. His partner R. L. Maple followed him, also using slides to illustrate points in his presentation. He discussed trouble shooting on control and flow equipment showing the members how to figure what is wrong with the equipment when it doesn't function, and how to trouble shoot or remedy such situations. Members presented several problems to the two visitors for solution from which all obtained some very good trouble shooting pointers. The speakers distributed a vest pocket folder which contains a temperature pressure chart for the more common refrigerants, a table indicating approximate pressure control settings, and a chart showing the carrying capacity of refrigeration lines. — HARRY BONTER.

Iron City Brewing Company Expansion Work Inspected

PITTSBURGH—Evaporative condensers, their construction, and particular application at the Iron City Brewing Co., Pittsburgh, were the object of inspection by the Pittsburgh Chapter, NAPRE. The chapter made the plant visit in lieu of a regular June meeting.

Iron City Brewing Co. has four new evaporative condenser units which can be operated in parallel or separately as the plant load may demand. Fans for the units are also operable separately which gives additional flexibility to control of load and for prevention of icing in winter operation. This equipment was vended to the brewery by the Frick Company. P. A. Willis, an associate member of the chapter and the Frick representative, was on hand to explain the construction of these condensers and their operation.

The latest compressor installed in this brewery is a Frick machine rated at 500 tons. It is the fourth such compressor installed in the last three years. Automatic features of the machine include clearance pockets which are controlled from the low side of the system for the purpose of giving variable capacity to each unit.

This brewery, like many others in the area has discontinued production of its own electric power over a period of the last decade. R. L. Conboy, another associate member of the chapter and engineer for the electric utility, was present for the field trip. He gave a brief history of this plant's policy of purchasing power. He reviewed for his listeners the story of outside power purchased up to the present date. Iron City purchase all of their power now for the plant and is using some rectifiers for converting a.c. to d.c., which is required by a few items of machinery.

Chapter president, Clyde Dalton, who is chief engineer of Iron City Brewery arranged the visit. He welcomed members and guests totalling some 50 persons. Consensus of the visitors was to the effect that this was one of the best plant visits the chapter has enjoyed for some time. Members were well pleased to observe the latest equipment and operation, and to inspect an engine room which is apparently a delight to the engineering staff which operates it. Pittsburgh chapter will discontinue meetings in July and August and resume in September. — OTTO KNOCH.

European Tour Reported By (Mrs.) Eliz. Venemann

DETROIT—Not only members-at-large will be interested in a letter received by the national officers of NAPRE, but a number of our chapter members as well. This letter received early in June came from Mrs. Elizabeth Venemann, the widow of NAPRE's late Educational Director, Professor H. G. Venemann. Mrs. Venemann wrote from Belfast, Ireland, while on a tour of the European Continent. She has been abroad since May 1, with her daughter, son-in-law and grandson.

Since May 1, the group has visited London, England and locations in Holland, Belgium, Germany, Switzerland and even Paris, France. Mrs. Venemann writes: "For me the highlights have been Windsor Castle in England, Heidelberg in Germany, The Hague in Holland, and the League of Nations at Geneva.

"Everywhere we had English speaking guides although most of them had quite an accent and one had to listen closely to get all that was said. We flew from Paris to Belfast and from there to Glasgow and to Liverpool where we'll sail on the SS Parthia for New York. We had guided tours everywhere until Ireland where we toured in rented cars."

Mrs. Venemann indicated that her son-in-law flew his private plane from California to Lafayette and from there to New York where they left it to take ocean surface transportation to Europe. Her comments with regard to keeping to the left while driving in certain of the continental countries will be somewhat amusing to the NAPRE members abroad.

B. E. Smith, member-at-large at Fairmont, Minnesota, recently corresponded. He is currently installing a new plant for his firm in Jackson, Ohio. This will be the third plant established by the firm which packs and distributes Oriental-American foods. In his travels, Smitty occasionally has the opportunity to drop in at the national office or to pay a call on another member-at-large in such places as Champaign, Illinois and Duluth, Minnesota.—Roy T. Burns.

New Rio Grande Officers

HARLINGEN, TEXAS—Leaders of Rio Grande Valley Chapter NAPRE elected in April were installed at the Chapter meeting on Tuesday, May 14, by Angus Casburg, national president. Those installed were: President, Clyde Young, ice plant operator, Southern Texas Ice & Service Co.; Vice-President, Olen Fisher, operator, Southern Texas Power and Light; Treasurer, Encarnacion Contreras, repair division, Southern Texas Ice & Service Co.; Secretary, Armin Doneis, chief engineer, Pharr Ice Company, and Sergeant-at-Arms, Rube C. Keener, chief operator, Southern Texas Ice & Service Co.

Mrs. Mary Doneis accepted the office of Secretary for her husband, who wasn't present because of a business trip to Laredo. After the installation the chapter followed its usual custom of a potluck supper social. This buffet had been entrusted to the ladies. They furnished a generous supply and a wide variety of beverages, ham, salads, fine desserts and trimmings.—Barney Majeskey.

Jackson Miss. Group Asks NAPRE Charter

HINDS COUNTY—After two organizational meetings, a group of refrigeration engineers in Jackson and local areas of Hinds County, Miss., made application to NAPRE for a charter. First meeting of the group was held May 27, at which time National Vice-President Frank L. Chase, Director John N. Mariakis, and National Secretary, J. R. Kelahan were on hand at Jackson to explain the objectives of the Association. That meeting was held in the auditorium of Hinds Junior College in Hinds, Miss.

Second meeting of the group was held in the County Court House of Jackson, Miss. J. R. Thompson, shift engineer for Swift & Co. at Jackson, made a brief explanation once again to those present, of the NAPRE's objectives. He described the advantages to be derived through membership in a local chapter as compared with member-at-large status. Following the question and answer session on how to join, eligibility and classification of membership, dues and fees, and the usual barrage of inquiries, Thompson, who was acting as the deputy of the national body,

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Is ideal for cold storages, freezers, food processing and meat packing plants, etc. Manufactured from 2" dia. F.W. steel pipe and 7" square 14- gauge fins, Frick finned pipe gives maximum heat transfer per dollar invested. Each fin is bonded to the pipe under tons of hydraulic pressure. All assemblies are hot-dip galvanized.

These new Frick finned coils require only one-quarter of the space needed for bare pipe having the same surface. See your nearest Frick Branch or Distributor for complete details, or write for Bulletin 158.

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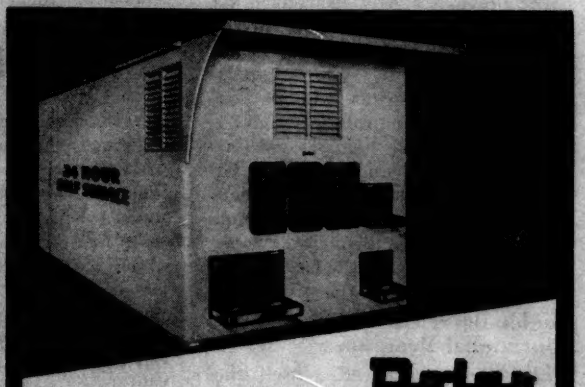

Parlour

Style-Line Ice Vending Stations Shipped Ready-To-Operate

Photo: Station 8' wide x 20' long, equipped with three vendors to sell 10¢ bags cubes; 25¢ cubes; and 25¢ bags crushed.

- Sparkling White Exterior
- Beautiful Streamlined Design
- National Rejectors Coin Mechanisms
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- Protective Canopy
- Automatic Counter
- Florescent Lights

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REFRIGERATION ENGINEERING COMPANY
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asked for the election of a temporary chairman.

Instructor A. G. Liss of Hinds Junior College and Fred Greiner, chief engineer of Swift & Co. at Jackson, were nominated. Following a run-off election it was announced by the tellers that Fred Greiner had been elected temporary chairman of the petitioning group. Mr. Greiner then called for nominations for secretary-treasurer pro tem. J. R. Thompson was nominated and there being no other nominations, he was elected by acclamation. Following the election of these two officers, Fred Greiner then appointed A. G. Liss as chairman of the group's educational committee. Additional meetings will be held through the summer months with the intention of starting a full fledged series of chapter meetings early in the Fall. Over two dozen engineers attended the two meetings, out of which 21 members signed the petition for the charter.—J. R. THOMPSON.

Illinois NAPRE Host to Annual National Meeting

CHICAGO—Double-headers or twin-bills in sports or other entertainment will have nothing better in the two-for-one price than the NAPRE annual meeting this year which will be held Monday, November 18 through Thursday, November 21, at Chicago. In addition to the annual convention activities in the education, business and social line, the Chicago location and dates provide the added opportunity for members and guests to take in the 10th All-Industry Air Conditioning and Refrigeration Exposition to be held the same week at the Chicago International Amphitheatre.

For NAPRE members, this will be the first opportunity to attend the "fair" of the Refrigeration and Air Conditioning Industry. NAPRE has never previously held its convention simultaneously with the show in the same city. All types of refrigerating and air conditioning systems, equipment and components will be displayed by manufacturers, assemblers and vendors in the field. Everything from automotive and domestic air conditioning to the largest commercial and industrial refrigeration equipment will be displayed. Some 300 exhibits are expected.

Double-Barreled Educational Program

Like the annual meeting itself, the educational program offered this year is even a double feature. There are 12 presentations scheduled mornings only, for four days. The national educational committee has arranged the program in this manner in order that afternoons will be free to visit the All Industry Show or to undertake field trips to Chicago refrigerating enterprises.

Through the courtesy of Fruit Growers Express, the training car FGEX 1600 will return to the NAPRE convention again this year. It was spotted at the NAPRE meeting in Detroit last year and has been promised for the '57 Fall meeting, Chicago. More members will have the opportunity to inspect the equipment in this ideal training classroom. Instructors will be on hand and will help NAPRE members and guests with their questions. Special instruction classes can be arranged in advance with the National Office.

Chicago, The Host City

At the foot of Lake Michigan, in the heart of the richest valley on the globe, towers Chicago, greatest metropolis of the Middle West.

Because Chicago is ideally located at the Nation's center and convenient to all forms of transportation, more people can travel to its center at less cost and in less time than any other city. This, plus her capacity to satisfy practically every visitor desire, tells why she is such a popular meeting spot.

Visiting members never need to worry about what to do in any spare times between meeting sessions. Especially for the young ladies, here are the world's best stores. From all-over the USA millions come annually for the sole purpose of shopping in the wonderous mercantile palaces on State Street. This thoroughfare has fittingly been called by many the real "Main Street of the Nation".

Other points of interest for the delegates are the Museum of Science and Industry which is in the vicinity of the Convention site. Real coal mines operate; delegates see themselves on Television; and visitors may walk through a World War II German Submarine. All of these interesting exhibits are just five minutes away from the Del Prado or Sherry Hotels, meeting quarters.

Going North towards the loop along the most beautiful Lakeshore drive visitors can visit the Shedd Aquarium, Adler Planetarium, Soldiers Field and the Natural History Museum. At the Art Institute they can see America's second finest collection of cultural treasures.

Evening entertainment? Chicago offers the finest entertainment, dancing, and dining in the country. All of these facilities are awaiting you. Chicago is eager to prove itself the ideal Host City. NAPRErs will like Chicago!!

ASHAE Holds Semi-Annual Meeting

THE Semi-annual meeting of the American Society Heating and Air Conditioning Engineers was held June 24 to 26 at Murray Bay, Quebec Province, Canada. The Society held six technical sessions at which 13 technical papers were presented and two symposiums were conducted. One symposium was on Air Conditioning Instrumentation, and the other dealt with Sound and Vibration.

The symposium on Instrumentation presented the following subjects and speakers; Fundamentals of control, V. Robert Baird, Chicago, Ill.; Control of High-velocity Single-duct Systems, W. G. Young, Rockford, Ill.; Control of High-velocity Double-duct Systems, H. W. Alyea, Milwaukee, Wis.; and Coordination of High-velocity Design, L. F. Flagg, Minneapolis, Minn.

Among the technical papers presented were Thermal Circuit Analysis for Developing Application Engineering by Stanley F. Gilman, senior research engineer and O. William Clausen, research engineer, both of Carrier Corp. Research Department; Saturation Pressure of Water on the New Kelvin Temperature Scale by J. A. Goff, professor of mechanical engineering, University of Pennsylvania; Criteria for Room Noise from Air-conditioning by C. M. Ashley, chief staff engineer, Carrier Corp. Studies in Silencing a Diesel-driven Heat Pump was the topic of a paper by H. H. Vickers, chemicals research division, and R. W. Sage, process research division, Esso Research and Engineering Co., Linden, N. J. Design and Performance of a Portable Infiltration Meter was presented by Carl W. Coblentz, mechanical engineer and Paul R. Achenbach, chief, air-conditioning, heating and refrigeration section, U. S. Department of Commerce, National Bureau of Standards, D. C.

Frozen Food Plant Damaged

AN estimated $100,000 loss was reported by Ventura Farms frozen food plant at Oxnard, Calif. from a series of three explosions that gutted the cold storage vault. No one was injured.

Ice Sales for 1956 Decline—Dollar Sales $232,619,473 Tonnage drops to 25,915,553 Tons

SALES of ice during 1956 amounted to $232,619,473 for 25,915,555 tons; a decline from 1955 of 1.85 percent in dollar value, and 7.83 percent in tonnage. This is high-lighted following an annual survey made by the National Association of Ice Industries. Other major points brought out by the survey:

Average Gross Revenue per ton of Ice sold for reporting companies increased from $8.16 to $8.66 per ton.

Ice Cube Sales were 751,052 tons; a decline of 7.18%.

Sized and Crushed Ice Sales totalled 4,182,317 tons, a decline of less than 1%, actually .60%.

Load Factor of the operating plants was 35.91, a decline of 3.05%.

Total Daily Capacity of 197,700 tons—relatively unchanged from 1955.

Seasonal Storage Capacity — the capacity of the Industry's seasonal storage space is 2,265,800 tons.

Automatic Vending Outlets for the sale of Ice increased from 8,727 in 1955 to 9,576 in 1956, an increase of 9.73%.

According to the report, weather played an important part in the sales decline in 1956. Excessive rain and cool weather during the peak of the season were responsible for unusally large declines in tonnage in some of the large and heavy producing areas of the country. The Southwest was the only division which enjoyed an increase in tonnage. This increase was 1.72%. The Southern, Western and Southeastern Divisions had small declines of 2.7%, 5.7% and 6.1% respectively. New England, the Eastern States, Great Lakes, Mountain States, and Pacific Coast all had tonnage declines of 10% or more.

Dollarwise, however, the industry had a much better year, Dollar sales were within 1.85% of the figure for the previous year, despite a 7.83% loss in tonnage. Gross revenue per ton of ice sold increased from $8.16 in 1955 and $8.66 in 1956. Revenue per ton for cubes and sized and crushed ice went up $1.57 and $.84 per ton respectively.

The gain of 8.24% in cube sales in 1955 was almost all lost in 1956 by a 7.18% decline. Sized and crushed ice sales held up well, with a decline of less than one percent. The downward trend of the past few years for industrial and block ice continued with another 9% decline in sales.

There were minor shifts, by divisions, in the types of ice service provided. For the country as a whole, however, there was little change in the percentage of companies now selling cubes, sized ice, and crushed ice. Roughly one-third of the companies sell cubes, 45% sized ice, and 75% crushed ice.

Total daily production capacity showed little change. The Industry's load factor decline 3.05% to 35.91 along with the decline in tonnage. The survey indicated that the Industry now has 2,265,800 tons of seasonal Ice storage space.

Industrial and block ice accounted for the major loss in tons and dollars in 1956. This category, however, still represents 81% of the Industry's total tonnage and 66% of its dollar sales.

The number of automatic ice vending outlets continued to increase. In 1955 there were 8,727. In 1956 there were 9,576, an increase of 9.73%.

Progress in Food Preservation Methods

QUICK SHEET, a periodical published by the National Association of Refrigerated Warehouses, reviews reports and publications which have an interest or bearing on the cold storage field. In July 1957, this six page bulletin reviews some of the progress made on new food preservation methods, on the advance of prepared frozen foods production, and the potential business which the St. Lawrence Seaway may bring Great Lakes storages. The bulletin also reports that ten food chains are among the 20 biggest U.S. retail merchants, cites some of the findings and recommendations made to the Senate Finance Committee concerning inflation, and reviews the CCC storage allocation policy. The Quick Sheet also carries a few sidelines on automation, lists some standards of record keeping costs, and reviews the ICC rail car demurrage increase.

New Methods of Food Preservation

On progress made in new methods of food preservation, Quick Sheet, included a four paragraph review of the freeze drying process reported on recently by scientists of the Raytheon Manufacturing Co. This is the report mentioned in the June TRRF bulletin. This method follows the procedure of freezing foods first and then sublimating the ice crystals from them by subjecting the foods to microwaves while the food is held under a vacuum. Beef, shrimp and strawberries were reported on. Reconstituting consists of submerging the food product in water. Process costs and packaging are the principal problems to be overcome.

Under the same heading Quick Sheet cited a recent report by the Quartermaster Food and Container Institute to the effect that the U.S. Army would be producing hundreds of thousands of tons of dehydro-frozen foods within the next few years. The NARW publication was careful to point out the difference between dehydro-freeze and freeze drying processes. In the former, foods are first dehydrated and then frozen for preservation purposes.

The third report on new methods of preserving food summed up a report by the Inter-departmental Committee on Radiation Preservation of Foods. That report stated commercial production in irradiated foods will possibly begin in 1960. The various departments and commissions of Government, in this joint report indicate that the wholesomeness and economic feasibility of irradiated foods will have been proven by that time. Quick Sheet did not indicate whether the report contained any data on whether or not refrigeration will be involved in the processing or in the storage of these irradiated foods.

New Raleigh Warehouse

A NEW cold storage warehouse to contain 1,250,000 cubic feet of space is being planned for Raleigh, N.C., it was announced by P. O. Poole, head of the Southeastern Bonded Refrigerated Warehouse, Inc.

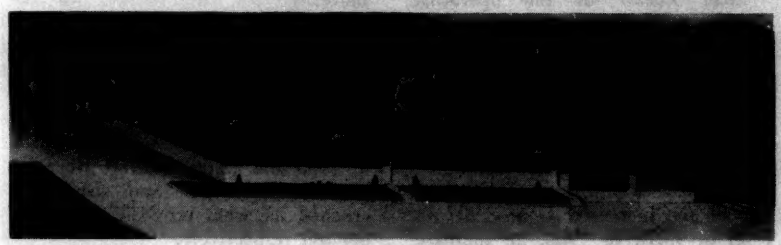
DEATHS

Kenneth C. McCrea

AFTER a brief illness Kenneth C. McCrea, Niagara Falls, Ont., Canada, one of the leading ice men in Canada for many years, died early in July. Immediate cause of his death was a coronary.

Mr. McCrea was one of the oldest and one of the most active members of the Canadian Association of Ice Industries. He was for many years the executive secretary of the Association. In recent years he was engaged in the sale and distribution of ice vendors and other accessories of the ice business.

New Plant Helps Baltimore Firm Maintain Its Highest Output



The new Baltimore Aircoil Co. plant located south of Baltimore, Md.

PEAK demands of the air conditioning and refrigeration industry are being met by new manufacturing facilities such as those completed for Baltimore Aircoil Co. Inc., early in 1957. Although some refinements, such as office painting and finishing, the sign atop the building front, etc., were not completed, Baltimore Aircoil Co. began operations in this new million-dollar plant, located just south of Baltimore, Md. on December 1, 1956.

Within two months, production of B.A.C. evaporative condensers and cooling towers was at an all-time high for the company. INDUSTRIAL REFRIGERATION'S Technical Editor, J. Richard Kelahan, inspected the plant with its new up-to-date manufacturing equipment and methods, late in the Spring. He observed that the plant has twice the production capacity of the former B.A.C. plant, which was destroyed by fire in 1956.

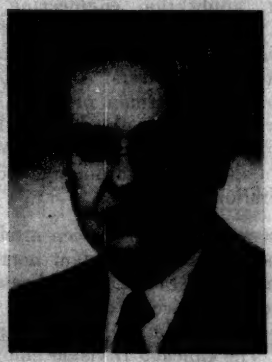
The firm has specialized in the manufacture of water-saving equipment since 1938. They claim to be the first Company to manufacture evaporative condensers up to 350 tons, and cooling towers up to 400 tons, in single factory-assembled units.

First B.A.C. evaporative condenser completed in new, million-dollar plant—John Engalitcheff, Jr. (right center), president of Baltimore Aircoil Co., Inc., congratulates Ray R. Forseille, vice president-production, on the completion of the first unit in the new plant. William E. Kablert (left foreground), vice president—sales, Joseph Pope (right foreground), plant superintendent, and key factory personnel look on.

News of PEOPLE

Hawkins Moved to Chicago

MEMBERS of the National Association of Refrigerated Warehouses and the National Association of Practical Refrigerating Engineers were pleased to learn early in May of the transfer of John A. Hawkins from the San Francisco Office of the Quartermaster General to a new position in Chicago. Hawkins was appointed Assistant Chief, Requirements & Distribution Division, Headquarters Military Subsistence Supply Agency, 226 West Jackson Blvd., Chicago. Hawkins is an honorary member of NARW and a past national president of NAPRE.



John A. Hawkins

The new agency to which Hawkins was appointed was established about a year ago to operate under the so-called Single Manager plan for subsistence within the Department of Defense. Previously, the organization was known as the Army Quartermaster Market Center System, and was principally concerned with purchase and distribution. The Single Manager assignment results from recommendations of a sub-committee of the Hoover Commission, establishing a single agency for common use items or common service activities within the Department of Defense.

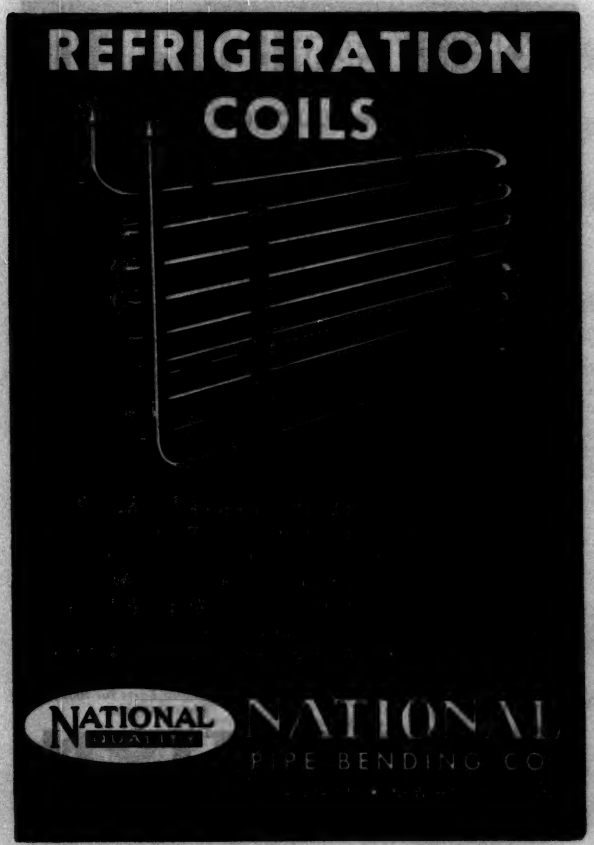
The primary objectives of the Single Manager Assignments are to eliminate duplication and over-lapping of effort between and among military departments, and to improve the effectiveness and economy of supply and service operations throughout the Department of Defense. Major General Henry Ray McKenzie, Chicago, Executive Director, heads up the agency to which Hawkins is assigned. McKenzie reported on the activities of his agency to the NARW convention at Atlantic City in April.

Diehl Receives Honorary Degree Doctor of Science

H. C. DIEHL, Director of The Refrigeration Research Foundation, received an honorary degree of Doctor of Science on June 10, from the University of Rhode Island, located in Kingston. University President Carl R. Woodward presented the diploma.

According to Diehl, the degree apparently was given first in recognition of TRRF's work and secondly what was deemed to be his personal contributions to refrigeration commodities through 40 years of professional work. However, other friends of the director, after reading the engrossing on the parchment, come to the conclusion that the efforts of the individual were emphasized rather than what the Director modestly credits to the Foundation.

ROBERT OLSON, has been named general cold storage sales manager for Beatrice Foods, it was announced by William G. Karnes, Beatrice's president at Chicago. Olson is vice-president of NARW's Great Lakes Chapter and was formerly a sales executive in the Chicago Cold Storage Warehouse Division.



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Australian Refrigeration Engineer Honored

AT a recent meeting of the Australian Institute of Refrigeration held in Melbourne, F. L. Goodman was honored with presentation of a Certificate of Honor, signed by each state president and an inscribed gold watch and chain. Mr. Goodman, of Gordon Brothers Pty Ltd. Brunswick, Victoria, has devoted almost an entire working life to refrigeration and was active in the organization of the Institute of Refrigeration Engineers in 1929, and served as secretary for nine years and one year as president. He was one of the moving spirits in arranging the Centenary of Refrigeration in Australia which was observed last September.

F. C. Andrews presents F. L. Goodman with certificate of honor at meeting of Australian Institute of Refrigeration

New ASRE President

NEW President of ASRE, Hermann F. Spoehrer, is a typical example of the Society's development of leaders from the membership, through the various committees and organizational units. Over the years Spoehrer has actively served ASRE in various section and national committees. He was chairman of the national finance and membership committees prior to becoming chairman of the technical coordinating committee, which chairmanship he held at the time of his election as national president. From St. Louis Section chairmanship he progressed through positions of section director to director-at-large, treasurer and vice president of the Society.

H. F. Spoehrer

Graduated from Washington University (St. Louis) in 1924, he is a member of the Tau Beta Pi and Sigma Xi fraternities. He has been associated with valve companies in executive capacity since 1926, acquiring experience in design development, application engineering, and sales management. He was elected president of the Refrigeration Equipment Manufacturers Association in 1946; was chairman of the All Industry Exposition held in Atlantic City in 1949. At present he is a director of the Air Conditioning and Refrigeration Institute.

MACK A. HUNT has been promoted to the position of assistant manager, Chicago Cold Storage Warehouse Division, Beatrice Foods, Co., announced by Wm. G. Karnes, president. The Chicago Division embraces two major plants in that city. Hunt was advanced to his present post from a position in the Chicago Sales Department. He has been assistant treasurer of TRRF for two terms.

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MODEL 300
AUTOMATIC VENDING STATIONS and VAULT VENDORS FOR EVERY PURPOSE.
Complete Line of Ice Scoring Machines — and Repair Parts for Immediate Shipment.
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Safety Pointer — Portable Electric Equipment Must be Grounded

IS YOUR portable electric equipment properly grounded? If not, burns and death-causing shock may result, according to the National Safety Council. Indirect injuries, too, may arise from use of ungrounded portable electric equipment if it's defective. For example, a workman received a slight shock from a defective tool and dropped it on his foot—suffering a painful injury. Slight shocks also have caused fatal falls from heights.

Common portable electric equipment—which often is used in homes as well as industry—includes drills, abrasive tools and saws. Even equipment that appears to be in safe operating condition may have shorted, broken or exposed wires, the Council said. They may make contact with the metal framework of the equipment, causing it to become energized. To reduce the danger of electrical shock, it's important that a separate ground wire be provided from the tool to a low-resistance ground connection. Water pipes, metal frameworks of buildings, or other metal structures in direct contact with the earth, may be used to ground equipment.

Here are some suggestions on grounding portable electrical equipment:

1. When wiring is enclosed with metal conduit or protected by armored cable, all couplings and fittings used to make connections between the conduit or cable and the electrical equipment should provide metal-to-metal contact to assure a continuous ground return.

2. If the wiring is nonmetallic sheathed cable or knob and tube work—such as is used in construction work—a third wire must be connected to the grounding terminal on the receptacle to provide a good conducting path to a grounding electrode or water pipe.

3. Grounding wires should be checked to see that the size is correct for the capacity of the nearest fuse or other automatic cutout.

4. No fuses, automatic cutouts or hand-operated switches should be inserted in a grounding line.

To insure automatic use of the ground, a common type of plug with a U-shaped grounding blade and two standard parallel polarized blades now can be used.

COMING CONVENTIONS

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
August 23, 1957
Tacoma, Wash.
L. F. Marsh, Secretary

NATIONAL SAFETY CONGRESS AND EXPOSITION
Sessions on Industrial Safety
October 21-25, 1957
Conrad Hilton and LaSalle Hotels, Chicago, Ill.
R. L. Forney, General Secretary

SOUTHWESTERN ICE MANUFACTURERS ASSOCIATION
Conference of Engineers
October 23-24, 1957
Gunter Hotel, San Antonio, Texas
P. A. Weatherred, General Counsel

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 12-15, 1957
Statler Hotel, Detroit, Mich.
Wm. T. Jobe, Exec. Vice-pres.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS
November 14-16, 1957
Shoreland Hotel, Chicago
R. C. Cross, Executive Secretary, New York City

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 18-21, 1957
Hotels Del Prado & Sherry, Chicago
J. R. Kelahan, Secretary

AIR CONDITIONING & REFRIGERATION EXPOSITION
November 18-21, 1957
International Amphitheatre, Chicago, Ill.
George Mills, Show Director

SOUTHWESTERN ICE MANUFACTURERS ASSOCIATION
December 1-3, 1957
Stephen F. Austin Hotel, Austin, Texas
P. A. Weatherred, General Counsel

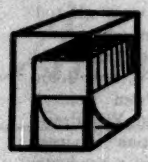
DELTA STATES ICE ASSOCIATION
December 8-10, 1957
The New Montelone, New Orleans, La.
Edna Vaughan, Secretary.

Tardy Employee Prevents Explosion

A TARDY employee and a fire probably saved the Broadway Ice Co. plant, Tampa, Fla., and surrounding buildings from destruction by dynamite. Walter Ross, an employee, was an hour late to work. In the meantime, a small fire broke out in the cement structure's engine room. After firemen doused the minor blaze, owner Frank Vacanti and an electrician checked the plant wiring. They found 113 sticks of dynamite linked by wire in holes drilled in the cement walls.

Ross's customary first chore was to close a switch that started the ice-making machinery. Investigators said that if he had done so, the dynamite would have exploded. Authorities found no clues as to who placed the dynamite.

Super-Rapid Small-Ice



Rapid-Block-Ice

RAPID-ICE Installations
(fully covered by world patents)

Ice blocks, standard size and 56 to 340 lbs. Produced in 1½ to 2 hrs. freezing time. Tube ice produced in 5 min. freezing time. No brine — no corrosion — no crane — no tank — no agitators — no thawing tanks. Negligible thawing loss. Exceptional melting resistance. Achieving higher prices. Simplified clear-ice production. Large seawater ice blocks, without salt segregation, for fisheries. Starts immediately. Easy dismantling and maintenance. Not tied to buildings — very little space required. 20 — 30% power saving Automatic operation. Quick depreciation. Over 100 installations working satisfactorily. Rapid freezing process for the chemical industry. Desalting of seawater. Separation of substances dispersed in liquids and difficult to filter off, by a rapid freezing process. Plants of 1 to 500 tons capacity can be supplied with short deliveries, by our licensees:
Italy — Costruzioni Meccaniche Barbieri s. r. l., Bologna
Norway — A/S Drammens Jern, Drammen
England — J. & E. Hall Ltd., Dartford Ironworks, Dartford/Kent
Germany — Gebr. Piersch, Illertissen in Bavaria
France — Soc. des Usines Quiri & Cie., Strasbourg-Schiltigheim
Spain — Ramon Vizcaino S. A., San Sebastian.

RAPID-ICE-FREEZING Ltd.,
Zurich 4, Switzerland
Kanzleistrasse 127; Tel. Nr 25 66 23
Cable Address: "Icefreezing Zurich"

MANUFACTURERS' NEWS

York Division Borg-Warner Names New Officers

THE Supervisory Board of Directors of the York Division of Borg-Warner Corporation elected the following officers: Henry M. Haase, President and Chief Executive Officer; Stewart E. Lauer, Chairman of the York Division Supervisory Board; Marion F. Dick, Secretary and General Counsel; J. J. Floreth, Vice-President and Director of Installation Services; J. M. L. Joslin, Vice-President and Director of Personnel; Rodney F. Lauer, Vice-President and Director of Engineering; W. F. Lynne, Vice-President and Director of Finance; Austin Rising, Vice-President and Director of Marketing; R. K. Serfass, Vice-President and Director of Operations and Jay E. Siler, Assistant Secretary and Treasurer.

Borg-Warner Corporation officials attending the meeting who are also members of the York Division Supervisory Board were Roy C. Ingersoll, Chairman of the Board; Robert S. Ingersoll, President; L. G. Porter, Executive Vice-President; R. W. Murphy, Vice-President and General Counsel and Albert Steg, Financial Vice-President. William J. Meinel, Chairman of the Board for Heintz Manufacturing Company, Philadelphia and a York Division Board Member also attended the meeting.

Two new Vice-Presidents were elected when William F. Lynne, formerly Secretary-Treasurer was elected to Vice-President and Director of Finance, and John J. Floreth was promoted from Central District Manager, Chicago, to Vice-President and Director of Installation Services. Mr. Lynne who is a C.P.A. is a graduate of the University of Pennsylvania and has been with York since 1935 in various staff assignments. J. J. Floreth is an engineering graduate of the University of Illinois and completed the York College graduate training course in July 1930. Since that time he has been on sales and administrative assignments in the York field organization.

M. F. Dick, attorney for the York Division since 1936 was elected to a new post as Secretary and General Counsel. Mr. Dick graduated from Wharton School, University of Pennsylvania with a BS degree and obtained his LLB from Temple University in 1933.

Jay E. Siler, a graduate of Thompson Business School of York and an employee since 1931 was elected Assistant Secretary and Treasurer. He is also General Insurance Manager for the York Division.

During a tour of the development and research laboratories many new air conditioning and refrigeration products were presented. The board members also observed the operation of a new absorption type water cooling system applicable to large installations for both process cooling and air conditioning.

Sporlan Changes

THE Sporlan Valve Company St. Louis, Mo. recently appointed Joseph R. Nolet to take over their Boston Office. Nolet replaces Thor Gislason who has been named to the engineering staff at Sporlan's home office in St. Louis. Nolet, an experienced sales engineer, was formerly associated with a large refrigeration and air conditioning firm in Boston. A native of Boston, he will continue to make his home there. He will cover the Boston area and all of New England.

Thor Gislason

Joseph R. Nolet

Gislason's move to St. Louis is part of a program to expand the company's engineering, research, and development facilities. Prior to joining Sporlan, Gislason worked as a design, installation, and maintenance engineer on some of the largest refrigeration projects in Iceland. Gislason, born in Iceland, was educated in the United States. He holds a B.S. in Mechanical Engineering from M.I.T. and a M.S. from Harvard.

Allied Chemical & Dye Appoints Agents

THE NITROGEN Division, Allied Chemical & Dye Corporation, New York, has appointed a number of agents to handle sales for Barrett Brand Anhydrous Ammonia in cylinders. Among the appointments are:

Wisconsin Refrigeration Supply Co., Green Bay, Wis. to handle sales in Northwest Wisconsin and western portion of the Michigan peninsula.

Mid-Continent Chemicals, Inc., South Bend, Ind. to handle sales in Southwestern Michigan and Northern Indiana.

Thompson-Hayward Chemical Co., Shreveport, La., to handle sales in Northern Louisiana and Eastern Texas.

Armstrong Appointments

JOHN J. ROPER, assistant district manager of the Boston Office of the Armstrong Cork Company's Insulation Division, Lancaster, Pa. has been appointed district manager, succeeding T. R. Nunan, who retired effective June 1. Mr. Roper, who was named Assistant District Manager of the Boston Office some months ago, joined Armstrong with an established background of 24 years in the heat insulation field, most of which was spent in the Boston area.

John J. Roper

T. R. Nunan

Active in the New England Asbestos Contractors Association, he is a past president of the organization and is currently a member of their Executive Committee and, as a representative of the Association, is a trustee of the Welfare Fund of Asbestos Workers Local No. 6 of Boston. Mr. Roper was graduated from Suffolk University in 1941, with a Bachelor of Laws degree.

Mr. Nunan joined Armstrong in 1915, following his graduation from the University of Kentucky. Since that time, he has served in many sales, supervisory and executive capacities with the Company and as head of the T. R. Nunan Company, an Armstrong Insulation distribution firm which operated in the Boston area from 1936 to 1941.

CATALOGS AND BULLETINS

Brochure Outlines Corrosion Proofing Data

SELECTING the best corrosion proofing methods and products, determining comparative resistance of various cement mortars and calculating quantities needed are outlined in a revised, up-to-date brochure issued by Pennsalt Chemicals Corp., Philadelphia, Pa.

The 8-page illustrated manual contains tables giving detailed information on Pennsalt's line of corrosion proofing cement mortars, interliners, protective coatings and linings. Factual data are based on studies made in 17 Pennsalt plants involving corrosive atmospheres from the manufacture of sulfuric, hydrofluoric and other highly corrosive acids, organic chemicals and volatile alkalies. Installations surveyed include linings in acid concentrators, stacks, pickling tanks, brick and tile floors, as well as sumps, pits and trenches for handling industrial wastes.

New Frick Bulletin

THE Frick Company, Waynesboro, Pa., is offering a new bulletin, No. 97-F, to the trade. This 10-page bulletin on low-pressure refrigerating units covers food service and cold storage, air conditioning and special services. It is elaborately illustrated, with details on particular installations. Write to The Frick Company for a copy of this Bulletin.

Bulletin on Self-Closing Pipe Insulation

COMPLETE specifications for Mono-Kover, a slit, one-piece, sectional type molded mineral wool pipe insulation that snaps into place, are presented in a new three color bulletin published by the Baldwin-Hill Company, Trenton, N. J. In addition to describing completely the insulating properties of the material, the pamphlet explains and illustrates approved application methods. Thermal conductivity is shown graphically for every temperature throughout its operating range (to 350 F).

The bulletin lists and describes the various facings for the material which are available and presents, in tabular form, thicknesses recommended to insulate pipe sizes from ¾-in. to 24-in. according to temperature and type of application. Types of applications include: industrial, commercial, institutional, hot water, low pressure steam, cold piping and dual temperature service.

The Baldwin-Hill company also operates plants in Kalamazoo, Mich. Huntington, Ind. and Temple, Tex.

Ready Power Bulletin On Air Conditioning

INCREASING popularity of natural gas drives in air conditioning applications, both commercial and industrial, have prompted publication of a new Sales Bulletin No. 284-2 by the Power Plant Division of the Ready Power Company, Detroit, Michigan. Manufacturers of gas and diesel electric power units for industrial trucks for more than 33 years, the Ready Power Company interested itself in air conditioning about the time the commercial air lines air-conditioned their equipment. Some of the first applications the firm made in the air conditioning field were the ground air conditioning systems used by the large passenger planes prior to flight.

Recently the firm has turned its attention to installations where natural gas afforded economic advantages over other types energy source. Typical industrial applications described in the bulletin are the Carnf Co. located in Brookhaven, Miss., and a newspaper warehouse in St. Louis, Mo. The Carnf comany manufactures precision electric condensers and filters. The Ready Power natural gas unit installed for that firm maintains extra low humidity for processing of the electrical components. Write the Ready Power Co. for a copy.

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ALL MATERIALS
Stainless Steel, Copper, Steel

FOR AMMONIA & FREON

Headered evaporator coil for liquid cooling or low temperature blast freezing. Also suitable for use with low temperature brine.

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REFRIGERATION NOTE BOOK

by PAUL B. REED

THIS NOTE BOOK of condensed refrigeration information represents many years of work in accumulating practical data—"culling out" all extraneous material—so as the author states, "the reader will find a handy and easily carried source of information not usually kept in memory."

You will be surprised at the wealth of material that has been included in this convenient and practical reference Note Book. It is written in layman's language, without complicated formulas. In short, it is a tool responsible for the operation of refrigeration equipment.

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Classified Advertising

USED EQUIPMENT—wanted & for sale

FOR SALE—3x5, 8x8 Yorks. 5x5 Frick. 15 ton condensor, shell & tube $100.00. 20" receiver. Valves up to 4", one-half price. Write E. Nebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois. WAbash 2-3299

WANTED—300-lb. ice cans size 11½x22½x44. Stewart Artificial Ice Co., 739—1st St., Williamsport, Pa. Phone Williamsport 2-1414.

PERFORMANCE—If that's what you're looking for in your compressors, don't miss the Ball Valve ad on page 7 of this issue.

FOR SALE
4—10"x10" 4-cyl. York duplex D.C. to 225 h.p. motor.
2—10"x10" 2-cyl. Frick D.C. to 100 h.p. motor.
2—10"x10" 2-cyl. York D.C. to 100 h.p. motor.
3—9"x9" 2-cyl. York D.C. to 75 h.p. motor.
1—7¾"x5" Frick booster.
2—7½"x7½" 2-cyl. York compressors.
1—6"x6" Frick 2-cyl. compressor.
1—5"x5" York 2-cyl. compressor.
1—3"x3", 1—4"x4", 1—5"x5" condensing units.
11"x22"x47" — 11"x22"x31" ice cans.
20—100-ton ice plants, York and Frick.
1—3¼"x3" 8-cyl. V/W York belt driven ammonia compressor.
1—3¼"x4¼" 6-cyl. V/W York ammonia booster compressor.
1—50 ton Buffalo Freon evaporative condenser.
ENTERPRISE EQUIPMENT CORPORATION
79 Alexander St., Yonkers, N. Y., Box 502
Cable: ENEQCO — Phone Yonkers 8-8118-9

FOR SALE
10x10 & 9x9 York ammonia compressors.
10x7½ & 8x6 York Model D-8 boosters.
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4x4 York self-contained unit.
16"x6' & 20"x10' receivers.
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Backed by a quarter-century of national and international experience, V. C. Patterson & Associates staff of specialized engineers is available to aid you with your refrigeration, insulation, food-freezing, warehousing, and allied problems. For new construction or for renovating present facilities, you'll find our engineered plans will mean greater efficiency and real money-saving operations. What's your problem? Write us.

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Ball Valve Co. 7
Barada and Page, Inc. ..... 2 and 49
Bower Chemical Mfg. Co., Henry 52
Brown Mfg. Co., Inc., K. G. 49
Butcher Boy Refrigeration Door Co. 1

Caterpillar Tractor Co. 12
Central Ice Machine Co. 56
Chemical Solvent Co. 45
Chicago Nipple Mfg. Co. 56
Classified Advertising 55

Dole Refrigerating Co. 6
Dow Chemical Co., The 11

Frick Co. 47

General Chemical Div., Allied Chemical & Dye Corp. 9
Gifford-Wood Co. ..... Inside Front Cover
Greene, Van R. H. 56

Jamison Cold Storage Door Co. ..... Back Cover

King-Zeero Co. 29
Kramer Trenton Co. 5

Link-Belt Co. 33

National Pipe Bending Co. 51
Niagara Blower Co. 43

Ohio Galvanizing Co. 51
Ophuls & Associates, Fred 56

Pacific Lumber Co. 25
Patterson & Assoc. Inc., V. C. 56
Perfection Ice Scoring Machine Co., The 52
Presstite Keystone Engineering Products Co. 39

Rapid-Ice-Freezing Ltd. 53
Refrigeration Engineering Co. 47

Shank Co., Cyrus 10
Sporlan Valve Co. 41

Vogt Machine Co., Henry, Inside Back Cover
Voss Co., Inc., J. H. H. 37

Wanted and For Sale Advertising 55

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And boost tonnage with Vogt BRINE COOLERS

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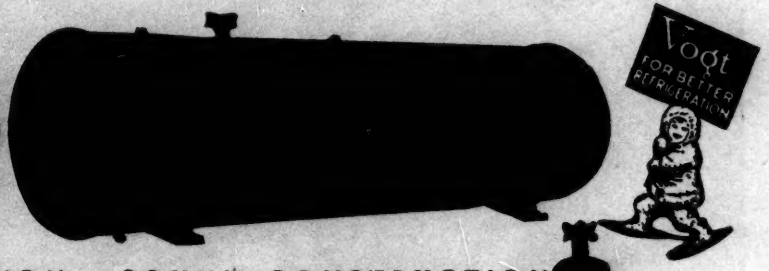

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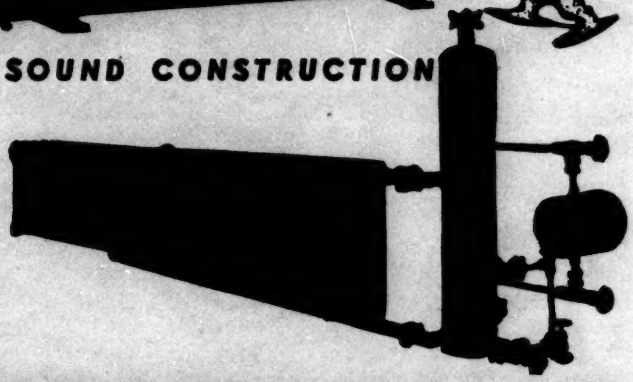

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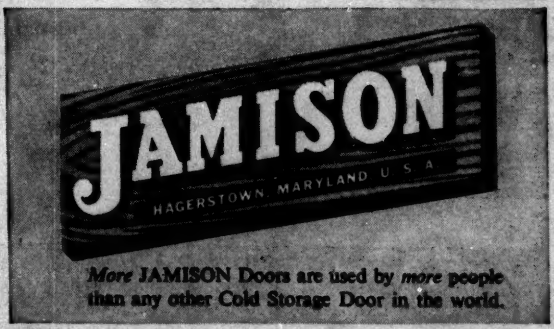

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.